

## ANNOTATED CHECK-LIST OF PLANTS OF LOWLAND GUANACASTE PROVINCE, COSTA RICA, EXCLUSIVE OF GRASSES AND NON-VASCULAR CRYPTOGRAMS

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Since 1961 a series of field biologists and field ecology courses have used the lowlands of Guanacaste Province, Costa Rica, as a natural laboratory. With the firm establishment of Santa Rosa National Park and various other protected areas (Palo Verde National Park, Cabo Blanco National Park, Finca La Pacífica, Monteverde Reserve, Rincón National Park), and with a growing enlightenment of the Guanacaste populace, we anticipate much further use of the Guanacaste lowlands by biologists. Almost all of these studies will use plant names. There has been considerable ambiguity in past use and determinations of plant names for this area. We would like to aid in avoiding further situations such as the recent exemplary study of the ecology of *Stemmadenia donell-smithii* (Rose) Woodson (McDiarmid, Ricklefs and Foster 1977, *Biotropica* 9:9-25), a rare local plant in Guanacaste, where most readers thought they were reading about the widespread common *Stemmadenia obovata* (Hook. and Arn.) K. Schum. which has been consistently misidentified as *S. donell-smithii* by biologists working in Guanacaste.

In constructing this check-list, we have tried to locate every plant name that has been applied to lowland Guanacaste (below about 400 m elevation) plants in the printed literature, in mimeograph literature of courses, and as determinations provided by herbaria. We have referred every unquestioned name used in this list to known herbarium sheets or known populations in the field. No plants have been included because they "ought to occur in Guanacaste". It is our impression that at least 90% of the species of lowland Guanacaste are listed here exclusive of grasses and non-vascular cryptogams. There are 603 names for species from Santa Rosa National Park and 992 names for species from Guanacaste as a whole. The ecological intent of the check-list is to include the species of the lowland deciduous forests and their contained riparian sites, explicitly avoiding the very large number of other species found at higher (and moister) elevations in Guanacaste. A few areas have not been thoroughly collected and should yield species new to lowland Guanacaste: Cabo Blanco, the mountains of the Nicoya Peninsula, the moist area between La Cruz and the Nicaraguan border at Peñas Blancas, and the seasonal swamps of the Tempisque river delta. Introduced plants are included here only if they are often found growing in wild or semi-wild circumstances.

We assume that the names used in this list will be followed in future publications. However, in papers focused on single species it is assumed that the author(s) will

check the original reference or refer vouchers to a specialist, and use our check-list only as a starting point. Some will disagree with the names used here and later revisions will undoubtedly change others. From time to time we will publish addenda and corrections to the check-list. If you disagree or have additions, please write to Janzen with explicit comments so that changes can be made. Eventually we assume the names used in this check-list will be those to appear in the Flora of Costa Rica being prepared by the Field Museum, Chicago (cf. Fieldiana Botany).

We have included, for many species, a brief descriptive statement that is intended to be an aid to field identification for those already familiar with particular genera. Again, for those diagnostic statements that are inadequate, we would greatly appreciate additions and corrections to be forwarded to Janzen.

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## KEY

- \*: Known to grow in Santa Rosa National Park.
- RCM: Names used as a very probable misidentification of a plant collected at Santa Rosa National Park by Ross Callaway; these names usually apply to plants in Mexico or northern Central America, or from wetter sites in Costa Rica.
- o: Questionable determination, name use, geographic origin, etc.
- : Cultivated or ornamental in Guanacaste.

## ACANTHACEAE

- \* *Aphelandra deppeana* Schl. & Cham. – herbaceous shrub to 2 m tall, tubular red hummingbird and euglossine-visited flowers, only common red-flowered acanth in lowland tropical dry forest of Guanacaste, moist areas, bracts toothed, less than 1 cm long.  
*Aphelandra aurantiaca* (Scheidw.) Lindl. – flowers orange to red, bracts toothed, more than 1 cm long.
- \* *Barleria micans* Nees – clear yellow-flowered herb-shrub, only yellow-flowered acanth in Guanacaste, moist forest edges.
- \* *Blechnum pyramidatum* (Lam.) Urb. (= *Blechnum brownei* Juss.) – small herbaceous, light blue flowers, large ovate pubescent bracts.  
*Bravaisia integerrima* (Spreng.) Standl. – tree with white flowers.
- \* *Dyschoriste valeriana* Leonard – axillary inflorescences, semi-herbaceous [*Dyschoriste quadrangularis* (Oerst.) Kuntze was inappropriately applied to *D. valeriana*].
- *Dyschoriste skutchii* Leonard – RCM (reported in Nicaragua, L. Durkee, personal communication).
- \* *Elytraria imbricata* (Vahl) Pers. [= *Elytraria squamosa* (Jacq.) Lind.] – small herb, inflorescences look like large *Lycopodium* cones, stems with numerous scale-like leaves, common weed in Central America.
- *Elytraria micans* – name applied in old OTS reports, misidentification (unknown from Costa Rica).
- \* *Justicia carthaginensis* Jacq. – herb with blue flowers, up to 1 m tall, spoon-shaped glabrous bracts on a relatively round in cross-section inflorescence, common roadside herb in moist sunny sites.  
*Justicia comata* (L.) Lam. – long thin leaves, herb. very expanded inflorescences, branches of inflorescence opposite or whorled.
- \* *Justicia pectoralis* Jacq. – very small bracts similar to *J. comata*, branches of inflorescence alternate or occasionally opposite.
- \* *Nelsonia brunelloides* (Lam.) Ktze. – prostrate herb in upland river bed at SRNP; small fuzzy inflorescences taste lemon-acidic when chewed.
- \* *Ruellia geminiflora* HBK. – big blue flowers one at a time; herb.
- \* *Ruellia inundata* HBK. – common blue-flowered herbaceous shrub to 2 m tall; very strong rank odor; shaggy-looking inflorescences, common weed along roadsides.
- \* *Ruellia paniculata* L. – like *R. inundata* but with flowers on 1-2 cm stalk so inflorescence is more expanded.
- \* *Staurogyne agrestis* Leonard – bracts green, plant pubescent with simple and glandular hairs.
- \* *Tetramerium nervosum* Nees – very square inflorescence in cross-section, tightly appressed bracts; strong venation on underside of bracts.

## AIZOACEAE

- \* *Mollugo verticillata* L. – herb with tiny lanceolate leaves in whorls.

- \* *Sesuvium portulacastrum* (L.) L. — beach herb with lavender flowers and fleshy elongate leaves; leaves taste salty internally.
- \* *Trianthema portulacastrum* L. — salty area edge herb; round small flimsy leaves.

## ALISMATACEAE

- *Alisma* PAO 920 — large-jointed marsh herb (probably *Echinodorus*).
- Echinodorus paniculatus* Mich. — aquatic herb with triangular stem and whorls of inflorescences on upright heavy stem, flowers long pedicellate.
- \* *Echinodorus andrieuxii* (H. and A.) Small — flowers short pedicellate to nearly sessile.

## AMARANTHACEAE

- \* *Achyranthes aspera* L. — herb with fruits that stick to clothing, have multiple spines on them, inflorescences pinkish in color with very tightly clustered fruits, not a strong odor, roadside weed common in most places, leaves opposite and acuminate.
- \* *Achyranthes indica* (L.) Mill. — leaves obtuse or rounded at apex.
- \* *Alternanthera pubiflora* (Benth.) Ktze. [= *Alternanthera williamsii* (Standl.) Standl.] — herb-shrub with large leaves, inflorescence pedunculate.
- Alternanthera sessilis* (L.) R. Br. — small herb with axillary inflorescences.
- Alternanthera tenella* Colla.
- Amaranthus hybridus* L. — spiny red calyx lobes, alternate leaves.
- \* *Amaranthus scariosus* Benth. — papery inflorescence, alternate leaves.
- \* *Amaranthus spinosus* L. — heavy long spines on stems, alternate leaves.
- Amaranthus viridus* L. — non-spiny inflorescence, alternate leaves.
- Celosia virgata* Jacq.? — alternate leaves.
- Chamissoa altissima* (Jacq.) HBK. — vine, alternate leaves.
- Cyathula achyranthoides* (HBK.) Moq. — fruit with recurved hooks, leaves opposite, north of La Cruz.
- \* *Gomphrena decumbens* Jacq. — low herb with white spheroidal inflorescence, roadside weed.
- \* *Iresine angustifolia* Euphr. — upper leaves tend to be narrower, inflorescences tend to be intermediate in length.
- \* *Iresine calea* (Ibáñez) Standl. — Inflorescences are capitate spikes.
- Iresine diffusa* Humb. and Bonpl. (= *I. celosia* L., nom. illeg.) — most delicate inflorescence, longest spikes.
- Pfaffia grandiflora* (Hook.) R. E. Fries [= *P. hookeriana* (Hemsh.) Greenm.] — like *Iresine calea* but calyx longer.
- \* *Philoxerus vermicularis* (L.) R. Br. — herb, on beach, looks like a *Sesuvium* vegetatively.

## AMARYLLIDACEAE

- \* *Agave* aff. *letonae* Trel. – common on coastal dry ridges.
- \* *Bomarea edulis* (Tussac) Herb. – herbaceous vine with yellow and pink flowers.
- *Bomarea chontalensis* Seem. – RCM (higher elevation plant).
- \* *Crinum erubescens* Ait. – white-flowered spider lily.
- \* *Curculigo scorzoneraefolia* (Lam.) Baker – single yellow flower from base, grass-like leaves, 5 to 30 cm tall.  
*Hypoxis humilis* HBK.? – may be *Hypoxis decumbens* L. but mature seeds are needed to be certain; 1–4 yellow flowers on peduncle; if one flower, it could be mistaken for *Curculigo*, but it has small bracts below the flowers.
- \*? *Hypoxis tonduzii* Paz.
- \* *Hymenocallis litoralis* (Jacq.) Salisb. – large herb with white flowers, open pastures.

## ANACARDIACEAE

- Anacardium excelsum* (Bert. and Balb.) Skeels. – huge evergreen riparian tree with very large oval leaves; tiny white flowers on exploded terminal racemes; fruits like miniature cashew with small thin purple-green (bat-dispersed) “apple” as pedicel, fruits dark purple-brown and wrinkled when ripe.
- *Anacardium occidentale* L. – commercial cashew occasional in gardens; native to Brazil.
  - \* *Astronium graveolens* Jacq. (= *A. fraxinifolium* Schott) – deciduous tree with compound shiny leaves; bark exfoliates in irregular plates leaving light beige patches on the tree; fruit fleshy, 1 cm long.
  - *Mangifera indica* L. – introduced large tree; mango; single-seeded very large fibrous nut.
  - \* *Spondias mombin* L. – forest tree, yellow-orange ripe fruits; several-seeded large fibrous nut in fruit.
  - \* □ *Spondias purpurea* L. – fence row tree, red plum-like fruit when ripe; nut as in *S. mombin*; may be native but so widely planted, hard to tell.
  - \* *Spondias radlkoferi* Donn. – Sm.-forest tree, green-yellow fruits when ripe; nut as in *S. mombin*.
  - *Spondias nigrescens* Pitt. – is probably a synonym of *S. radlkoferi*.

## ANNONACEAE

- Annona holosericea* Safford – rounded leaves at tip, very tomentose leaves, large mace-like fruits (this species may be confused with *A. purpurea*).
- \* *Annona purpurea* Moc. and Sesse – small deciduous tree with wide, large acuminate nearly glabrous leaves; flowers with fleshy pink-purple calyx; fruit a 10–15 cm diameter mace head with many seeds imbedded in it and sweet pulp around seeds.

- \* *Annona reticulata* L. — small deciduous tree with 6–10 diameter yellow (when ripe) spheroid smooth reticulate fruits; white juicy sweet pulp, black seeds, lanceolate glabrous leaves.
- \* *Desmopsis bibracteata* (Rob.) Safford — shrub with purple exploded fruit; flowers yellow.
- \* *Sapranthus palanga* Fries — small deciduous tree; cauliflorous flowers 10 cm long deep purple and foul smelling; fruits look like smoothly cylindrical 10–15 cm long green bananas in bunches.

## APOCYNACEAE

- o *Allomarkgrafia breneisiana* Woodson — RCM.
- Echites tuxtliensis* Standl. — herbaceous perennial vine with shiny dark green oval leaves; flowers coral colored with very long attenuated tips to the petals.
- Fernaldia pandurata* (A. DC.) Woods. — heavy woody vine.
- \* *Forsteronia spicata* (Jacq.) G. Mey — woody vine with white latex; fruit straight, 1–2 cm diameter, 10 cm long, groove down one side, not necessarily paired.
- \* *Mesechites trifida* (Jacq.) Müll. -Arg. — yellow-green flower, vine, wiry, small leaves.
- \* *Odontadenia macrantha* (R. and S.) Mgf. — 8 inch long heavy woody fruit, triangular in x-section when dehisced.
- \* *Prestonia acutifolia* (Benth.) K. Schum. — large glabrous leaves and yellow-green flowers.
- \* *Prestonia allenii* woods — large vine, very tomentose large leaves, yellow flowers.
- \* *Plumeria rubra* L. [= *Plumeria acutifolia* Poirét; there are also varietal names *rubra* L., *tricolor* (R. and P.) Woodson, *acutifolia* (Poir.) Woods.] — medium-sized deciduous tree on rocky outcrops; flowers white to yellow; branchlets very thick, ending in whorl of leaves or flowers [*Plumeria obtusa* L. var. *sericifolia* (C. Wright) Woodson has been described from Mexico to Salvador].
- Rauvolfia ligustrina* R. and S. — shrub on Nicoya península with acuminate and smaller leaves.
- \* *Rauvolfia tetraphylla* L. (= *Rauvolfia littoralis* Rushby) — shrub with red berries that turn black when ripe, obtuse leaf ends.
- \* *Stemmadenia donnell-smithii* (Rose) Woodson — riparian tree to 6 m height, leaves small (5–10 cm long), large yellow flowers, fruits to 15 cm diameter and beige, red-orange aril around black seeds.
- \* *Stemmadenia obovata* (Hook and Arn.) K. Schum. [= *S. o.* var. *mollis* (Benth) Woods] — shrub to small deciduous tree with large light green leaves; copious white latex flow when damaged; flowers yellow tubular about 5–8 cm long, a few open each day for many months on one plant, March through July (SRNP); fruit often in pairs (split ovary = “two fruits”), ripe fruit spheroidal and up to 10 cm diameter, thick-walled brown and partly dehiscent, red-orange aril around many black seeds [this plant has been commonly misidentified as *Stemmadenia donnell-smithii* (Rose) Woodson].

- *Tabernaemontana chrysoarpa* Blake – shrubby tree with multiple cream-colored 2–3 cm long narrow-corolla flowers in sprays.
- *Tabernaemontana citrifolia* L. – misidentification.
- \* *Thevetia ovata* (Cav.) A. DC. – shrubby evergreen tree with large yellow flowers; fruits are glabrous, fleshy and purple outside when ripe.
- \* □ *Thevetia peruviana* (Pers.) Schumann. – shrub with yellow flowers.

## ARACEAE

- Anthurium agnatum* Schott – Nicoya Peninsula and north of La Cruz.
- *Colocasia esculenta* (L.) Schott – commercial taro, growing at Finca La Pacífica, terrestrial.
- \* *Dracontium cf dressleri* Croat – huge twice compound leaf, terrestrial.
- Monstera adansonii* Schott [= *M. a.* var. *laniata* (Schott) Madison] – epiphyte with holes in the leaves.
- Philodendron scandens* C. Koch and Sello – entire arrowhead leaves, epiphyte.
- *Philodendron pittieri* Engler – RCM.
- Pistia stratiotes* L. – water lettuce.
- \* *Syngonium angustatum* Schott – palmately compound leaf, epiphyte vine.
- *Syngonium podophyllum* Schott – RCM.
- \* *Xanthosoma hoffmannii* Schott – terrestrial herb with palmately compound leaves.

## ARALIACEAE

- \* *Sciadodendron excelsum* Griseb. – small tree with multiple compound leaves, but some trees may attain 3 ft. DBH; bark rough, smooth cylindrical bole.

## ARISTOLOCHIACEAE

- \* *Aristolochia angucida* Jacq. – woody vine.

## ASCLEPIADACEAE

- \* *Asclepias curassavica* L. – yellow and red flowers, tall thin herb; ditch banks and roadsides, might not be native.
- \* *Asclepias oenotheroides* Cham. and Schlecht. – big wide leaf, low herb in grassland, white large flowers in rainy season.
- \* *Asclepias woodsoniana* Standl. and Steyerl. – low herb with thin long leaves, white flowers in rainy season.
- Blepharodon mucronatum* (Schlecht.) Dcne. – herbaceous vine with single white greenish large flowers on 1–2 cm stalks in clusters, pod long thin.
- Cynanchum liesneriana* L. Wms. – vine, very small leaves and tiny flowers.

- Cynanchum rensonii* (Pitt.) Woods. — flowers small and on stalks, leaves large, vine.
- Cynanchum schlechtendalii* (Dcne.) Standl. and Steyer. — little leaf vine with small spindle-shaped pods.
- *Calotropis procera* (Ait.) Ait.f. — one roadside plant on Pan-Am highway 3 km south of SRNP.
  - Marsdenia trivigulata* Bartlett — vine, small leaves, tiny flowers.
  - \* *Matelea quirosii* (Standl.) Woods. — Single large white flowers with purple reticulation, smooth spindle pod.
  - \* *Matelea trianae* (Dcne.) Spellman — balls of brown cup-line flowers, hairy stem, vine, large football-shaped pods with heavy flanges down the side.
  - *Matelea pleistantha* (Donn. Sm.) L. Wms. — RCM.
  - \* *Sarcostemma bilobum* Hook. and Arn. — heart-shaped shiny deep green leaves, clusters of single flowers on long petioles, small leaf vine.
- Sarcostemma glauca* HBK. — vine, herbaceous.
- Sarcostemma odoratum* (Hemsl.) Holm — small leaf vine.

#### BEGONIACEAE

- \* *Begonia filipes* Benth. — herb with white flowers, small leaves with sawtooth edges.
- Begonia plebeja* Liebm. — huge leaves, herb.
- *Begonia hygrophila* C. DC. — RCM.

#### BIGNONIACEAE

- \* *Adenocalymma apurense* (HBK.) Sandw. (sensu lato) — evergreen liana with round branches, mostly along streams, tendrils simple, flowers yellow, fruit a narrowly oblong 2-valved capsule with thick ridge with thick-bodied winged seeds; distinguish from other yellow-flowered vines by pubescent outside of corolla tube, or in fruit from all other bignon species by its winged but thick-bodied seeds.
  - \* *Amphilophium paniculatum* (L.) HBK. — common liana, tendrils trifid, branchlets sharply hexagonal, flowers purple, the lobes not opening, fruit an elliptic 2-valved capsule with pubescent-bodied seeds; distinguish from other bignons by non-opening flowers or by pubescent seeds; when sterile very like *Pithecoctenium crucigerum* but differs in stellate leaf trichomes, shorter pseudostipules, and never more than trifid tendrils.
  - \* *Amphilophium paniculatum* var. *molle* (Schlecht. and Cham.) Standl. like above but leaves very densely stellate pubescent below.
- Amphitecna latifolia* (Mill.) A. Gentry [= *Enallagma latifolia* (Mill.) Small] — a coastal shrubby tree growing just inland from the mangroves, leaves simple, alternate, flowers greenish white, bat-pollinated; fruits globose, not dehiscent. Differs from *Crescentia* in larger seeds and alternate leaves not borne in fascicles.



- Arrabidaea candicans* (L. Rich.) DC. — rare liana, similar to other *Arrabidaea* but leaves whitish beneath from tiny dense trichomes over under-surface.
- \* *Arrabidaea chica* (H. and B.) Verl. — liana.  
*Arrabidaea conjugata* (Vell.) Mart. — evergreen liana, tendrils simple, flowers magenta, fruit linear, flattened; distinguish from other bignons by inflorescences with narrow branches and pale calyces with dark-drying submarginal glands; when sterile the leaves are darker green than in most bignon and glabrate unlike other *Arrabidaea*.
- Arrabidaea corallina* (Jacq.) Sandw. — deciduous liana, sometimes shrubby, tendrils simple, flowers magenta, fruit linear, flattened; distinguish from other bignons by irregularly margined calyx, the rather square-edged capsule without a noticeable midline, and the rather strongly pubescent pointed leaflets. *Arrabidaea mollissima* has rounder nonpointed leaflets; *Xylophragma seemannianum* has stellate trichomes.
- Arrabidaea costaricensis* (Kranzl.) A. Gentry — usually more shrubby thin, viny, tendrils simple or lacking, flowers magenta, fruit linear, flattened; distinguish from other linear-fruited bignons by the shorter fruit, from other flowering *Arrabidaea* by the few-flowered lateral inflorescences and uniformly 5-dentate calyx without a white fringe; when sterile very like *A. corallina* but leaves mostly smaller, often mostly simple at base of branches, and usually a shrub.
- \* *Arrabidaea mollissima* (HBK.) Bur. and K. Schum. — common deciduous liana, tendrils simple, flowers magenta (rarely white), fruit linear, flattened, pubescent; distinguish from other linear-fruited bignons by softly pubescent fruit, from other flowering *Arrabidaea* by the uniformly 5-denticulate calyx with a whitish margin; when sterile the roundish leaflets with a fringe of trichomes around the margin are unique.
- \* *Arrabidaea patellifera* (Schlecht.) Sandw. — common evergreen liana, tendrils simple, flowers magenta, the buds with whitish tips, fruit linear, flattened; distinguish from other bignons by broadly opening almost saucer-like calyx; when sterile characterized by a fringe of longish trichomes along main leaf vein beneath and by a tendency to simple leaves, especially on shoots near base of vine.
- \* *Callichlamys latifolia* (L. Rich.) K. Schum. — uncommon huge evergreen liana, tendril-simple, huge flowers yellow, large glabrous fruit 8–10 cm long elliptic-oblong, flattened seed, wings brown like the body; distinguish from other bignons by very large flowers, large spongy calyces, or large woody, smooth, capsule valves; when sterile characterized by stellate trichomes on leaves and lack of an interpetiolar glandular field.
- Ceratophytum tetragonolobum* (Jacq.) Sprague and Sandw. — evergreen liana, tendrils trifid, flowers white or cream, fruit woody, linear-oblong, tapering to apex but not to base, rather squarish in cross-section; distinguish from other white-flowered bignons by straight corolla tube, from all bignons by the unique horn-shaped fruit; when sterile, characterized by subulate axillary pseudostipules and interpetiolar glandular fields.
- Clytostoma binatum* (Thunb.) Sandw. (= *C. isthmicum* Pitt.) — deciduous or evergreen liana, mostly in swamps or along rivers, flowers magenta, fruits round,

- densely echinate with curve-tipped spines, seeds thick, wingless; distinguish easily by its echinate fruit, much shorter and rounder than *Pithecoctenium*, the only other local echinate-fruited bignon; when sterile or in flower characterized by an axillary cluster of subulate pseudostipules resembling a small bromeliad or by lack of a nectariferous disc.
- \* *Crescentia alata* HBK. – shrubby tree with branches densely clothed in trifoliolate leaves (few branchlets); cauliflorous green and magenta flowers; fruit green indehiscent cannonballs.
  - \* *Crescentia kujete* L. – Shrubby tree with branches densely clothed in leaves (few branchlets); leaves simple; cauliflorous largely green flowers; fruit green indehiscent cannonballs (probably only an escape from cultivation in SRNP; 2 known individuals).
  - \* *Cydista aequinoctialis* (L.) Miers – evergreen liana, tendrils simple, flowers magenta (sometimes white with purple streaks in throat), fruit linear, flattened, seeds thin but the wings woody; distinguish by lack of nectariferous disc in the flowers, glandular fields in axils of most main lateral nerves on leaf undersurface, lack of pseudostipules, and (usually) sub-tetragonal young branchlets.
  - \* *Cydista aequinoctialis* var. *hirtella* (Benth.) A. Gentry (= *Cydista sarmentosa*) – like above but strongly pubescent, at least along main veins on leaf undersurface.
  - \* *Cydista diversifolia* (HBK.) Miers – very common evergreen liana, tendrils simple, flowers magenta, fruits linear, flattened; easily distinguished by its sharply tetragonal stem and leafy pseudostipules.
- Cydista heterophylla* Seib. – Deciduous liana, tendrils simple, flowers magenta, fruit linear to linear-oblong, each valve with a depressed central furrow bordered on either side by a raised longitudinal ridge; distinguish by the unique fruit and the tendency to simple leaves with an arcuate basal pair of lateral nerves with glandular fields in their axils (4 of these forming a terminal whorl in young plants).
- \* *Godmania aesculifolia* (HBK.) Standl. – deciduous tree; 6 (usually 7) or more palmately compound leaflets; pods dehiscent and long helical.
  - \* *Macfadyena unguis-cati* (L.) A. Gentry – common deciduous liana climbing by curved, trifold, cat's claw tendrils, flowers yellow, fruit elongate linear, flattened; the characteristic juvenile form has small leaflets and accentuated tendrils and is very frequent crawling up tree trunks or fence posts; the only Guanacaste species with cat's claw tendrils; the small ovate longitudinally striate stipule is also typical.
  - \* *Melloa quadrivalvis* (Jacq.) A. Gentry – uncommon liana, tendrils trifold, flowers yellow, fruit elliptic, woody, each valve splitting in half so apparently 4-valved; distinguish by the unique fruit; vegetatively and in flower very like *Macfadyena* but lacking the juvenile form of that species and with a smaller non-striate pseudostipule and the calyx subspathaceous with an apiculus on one side.
  - \* *Pachyptera hymenaea* (DC.) A. Gentry [= *Pseudocalymma macrocarpum* (Donn. Sm.) Sandw.] – tendrils trifold, flowers magenta to almost white, fruit linear to linear-oblong, the midline conspicuously raised; easily distinguished by the strong garlic or onion odor of all its vegetative parts (“pedo de padre”).
- Paragonia pyramidata* (L. Rich.) Bur. – Nicoya peninsula.

- \* *Pithecoctenium crucigerum* (L.) A. Gentry [= *P. echinatum* (Jacq.) Baill.] – common deciduous liana, tendrils often multi-branched, flowers white, the corolla tube sharply bent near middle, fruit oblong-elliptic, densely echinate; seeds thin with large very thin wings; the large echinate fruit (“peine de mono”) is unique (much larger than *Clytostoma*): this is the only Guanacaste species with a bent corolla tube; vegetatively the six-angled twigs are similar only to *Amphilophium* which has stellate trichomes, shorter pseudostipules and only trifid tendrils.  
*Pleonotoma variabilis* (Jacq.) Miers – uncommon evergreen liana, tendrils trifid, stem centers hollow, flowers light yellow to cream, fruit oblong-linear, rather woody, seeds rather small, thin, uniformly brown; unique among Guanacaste bignons in a bicomponent leaf, the sharply tetragonal stem is similar only to *C. diversifolia* but this species lacks pseudo-stipules.
- \* *Tabebuia ochracea* (Cham.) Standl. ssp. *neochrysantha* (A. Gentry) A. Gentry (= *Tabebuia neochrysantha* A. Gentry) – deciduous tree with 5-part palmately compound leaf; flowers abruptly produced, yellow; much of the leaf densely tomentose.
- \* *Tabebuia impetiginosa* (Martius ex De Candolle) Standl. (= *Tabebuia palmeri* Rose.) – deciduous tree with largely glabrous leaves except for pubescence in the axils of the lateral veins; flowers brilliant red-purple, with pubescent corollas. *Tabebuia palustris* Hemsl. – small shrub behind and under mangroves, white flowers; fruit glabrous with few large seeds (compared to other *Tabebuia*).
- \* *Tabebuia rosea* (Vertol.) DC. [= *Tabebuia pentaphylla* (L.) Hemsl.] – deciduous tree with glabrous leaves; flowers pink to white.  
*Tecoma stans* (L.) Juss. ex HBK. – rather local shrub or small tree, mostly along coast, occasional in gallery forest, common at slightly higher altitudes near bases of the volcanos. Flowers yellow, fruit linear. The only Guanacaste bignon with pinnately compound leaves (may well be escaped ornamental in lowland Guanacaste).
- \* *Xylophragma seemannianum* (O. Ktze.) Sandw. – Common deciduous liana, or shrub, tendrils simple, flowers magenta, fruit elliptic-oblong, trifoliate leaves, smaller than *Callichlamys*; distinguish by dendroid trichomes on leaves plus presence of interpetiolar glandular fields. In flower similar to *Arrabidaea* but with linear bracts in inflorescence.

## BIXACEAE

- \* *Bixa orellana* L. – shrubby small tree in riparian areas, largely evergreen, large pink open multi-anthered flowers appear at end of rainy season; large leaves, fruits 2–4 cm diameter spiny half-dehiscent spheres with many seeds inside.

## BOMBACACEAE

- \* *Bombacopsis quinatum* (Jacq.) Dugand [= *B. fendlerium* (Seem.) Pittier; = *B. fendleri*] – common large deciduous tree with numerous large thick spines on

bark of trunk and branches, flowers white, fruits a brown glabrous dehiscent capsule 4–6 cm long with seeds imbedded in cottony fluff; distinguish from *Ceiba aesculifolia* since *C. aesculifolia* has many fewer spines and has 15–20 cm long fruits.

- \* *Ceiba aesculifolia* (HBK.) Britt. and Baker — tree with heavy spines on the branches and a few on the trunk (looks like *Bombacopsis quinatum* with reduced spininess); fruits 15–20 cm long woody dehiscent capsule filled with fluff and 7–10 mm diameter round seeds, fruits look like American footballs.
- \* *Ceiba pentandra* (L.) Gaerth. — huge tree with wind-dispersed round black 6 mm diameter seeds in gray fluff (kapok), dehiscent woody fruits 10 cm long and blunt on the bottom end.
- *Ceiba acuminata* — this is a misidentification.  
*Ochroma pyramidale* (Cav. ex Lam.) Urban (= *O. lagopus* SW.) — balsa tree with huge leaves, 10–12 cm long white chalice-shaped flowers; fruit dry with fluff with seeds.
- \* *Pseudobombax septinatum* (Jacq.) Dugand [*B. barrigou* (Seem.) Pitt.; = *P. ellipticum*?] — large deciduous tree with smooth bark and vertical green stripes on the trunk; fruits 15–20 cm long elongate woody footballs, dehiscent, with kapok around the seeds, wind dispersed; rare, often in riparian sites.

## BORAGINACEAE

- \* *Bourreria* aff. *pulchra* Mill. — small flowers, fruits 1 cm long.
- Bourreria quirosii* Standl. — cream colored flower, shrub-tree, few big flowers, fruits 2 cm long.
- \* *Cordia alliodora* (R. and P.) Oken — common deciduous tree with swollen nodes occupied by *Azteca* ants; flowers white in dense clusters; wind-dispersed fruits single seeded about 7 mm long with five “petaloid” wings at one end.  
*Cordia collococca* L. — rare deciduous small tree with red juicy single-seeded 1 cm diameter fruits in clusters.  
*Cordia curassavica* (Jacq.) R. and S. — small shrub with elongate leaves, loosely expanded inflorescence.
- \* *Cordia dentata* Poir. [= *C. alba* (Jacq.) Roem. and Schult.] — occasional deciduous shrubby treelet with white juicy single-seeded ovoid 1–2 cm long fruits in clusters, flowers cream-yellow.
- \* *Cordia gerascanthus* L. — common deciduous tree on western edge of plateau in SRNP; flowers and fruits in synchrony on even-numbered years, tree crowns densely brown with millions of fruits that look like 1.5 cm long editions of *Cordia alliodora* fruits.
- \* *Cordia guanacastensis* Standl. — short-lived perennial with inflorescence as in *C. inermis* but up to 10 cm long, looks like a long white mulberry. This is likely to be the same as the Mexican *Cordia serratifolia* HBK., and *C. coyucana* I. M. Johnston is an unpublished synonym of *C. guanacastensis*.
- \* *Cordia inermis* (Mill.) I. M. Johnst. — annual herb to short-lived perennial to 2 m tall; inflorescence a cluster of buds, flowers and green fruits 2 cm wide and up to 4 cm long; ripe fruits red.

- \* *Cordia panamensis* Riley (= *C. toqueve*) – occasional deciduous tree with white juicy single-seeded 1 cm diameter globular fruits in clusters.
- Cordia pringlei* Robins. (= *C. starkii* Standl.) – bushy shrub to 1.5 m tall, common in some pastures; fruits red, inflorescence a disorderly 3–6 cm diameter ball of new large white flowers, buds, old flowers and fruits.
- o *Cordia polycephala* (Lam.) I. M. Johnston – RCM.
- o *Cordia ulmifolia* Juss. – is an old misidentification in an OTS hand-out.
- \* *Heliotropium angiospermum* Murray – big leaves, rounded fruit.
- \* *Heliotropium curassavicum* L. – succulent, seashore.
- \* *Heliotropium filiforme* Lehm. – smallest, linear leaves, white flowers.
- Heliotropium fruticosum* L. – leaves scattered in among inflorescence.
- \* *Heliotropium indicum* L. – big leaves, pointed fruit.
- \* *Heliotropium procumbens* Mill. – rather oval leaves, densely hirsute.
- \* *Heliotropium ternatum* Vahl. – thin long leaves, more robust inflorescence than *H. filiforme*.
- Tournefortia angustiflora* R. & P. – west of Nicoya.
- \* *Tournefortia hirsutissima* L. – very hairy brown stem, roundish acuminate leaves.
- \* *Tournefortia maculata* Jacq. – less densely pubescent.
- Tournefortia volubilis* L. – silvery underside to smaller leaves with much shorter pubescence.

## BROMELIACEAE

- \* *Bromelia karatas* L. – curved spines on margins of leaves, flowers in sessile non-elongate inflorescence in center of plant.
- \* *Bromelia pinguin* L. – curved spines on margins of leaves, elongate inflorescence, leaves turn red at base before inflorescence produced, fruits yellow and 2–4 cm long ovals (vertebrate dispersed), terrestrial.
- \* *Catopsis nutans* (Sw. ) Griseb. – inflorescence single spike or branched, leaves thinner than in *Tillandsia*.
- \* *Tillandsia brachycaulos* Schlecht. – bracts of inflorescence long, leaf-like, sometimes reddened, not distichous, lepidote scaly bracts.
- Tillandsia caput-medusae* Morr. – inflorescence branched, bracts distichous, fairly open, base of plant bulbous, leaf tips tend to be curled, leaf golden brown or gray and granular short pubescent tomentose.
- \* *Tillandsia circinnata* Steud. – inflorescence a spike, semi-distichous; base of plant somewhat bulbous, leaves gray granular tomentose or scaly.
- Tillandsia fasciculata* Sw. – inflorescence with several spikes on a peduncle or a solitary spike, bracts distichous, glabrous, leaves densely lepidote scaly.
- Tillandsia schiedeana* Standl. – inflorescence of single spike non-distichous or semidistichous, bases of leaves forming stem 3–10 mm thick by 2 to 6 cm long, leaves densely covered with yellowish gray scales.
- o *Tillandsia bakeriana* Britt. – RCM.
- o *Tillandsia juncea* Leconte – RCM, very narrow almost grass like leaves.

*Vriesia gladioliflora* (Wendl.) Ant. — Leaves 2 to 3 cm wide, leaves densely lepidote scaly, inflorescence tends to be one sided.

#### BURSERACEAE

- \* *Bursera graveolens* (HBK.) Triana — very small deciduous tree-shrub with compound leaf with alate petiole, leaflets with very acuminate tip; on rocky dry ridges near the coast.
- \* *Bursera permollis* Standl. and Steyerl. — diminutive tree-shrub edition of *B. simaruba*; deciduous trifoliolate leaves off of largely horizontal branches; on dry ridges above Playa Naranjo, SRNP.
- \* *Bursera simaruba* (L.) Sarg. — red-barked deciduous tree.
- \* *Bursera tomentosa* (Jacq.) Triana and Planch. — deciduous tree with smooth gray bark with many lenticels developed into large fissures; leaf tomentose, compound with alate petiole, leaflets with blunt to rounded apex; fruit fleshy, somewhat triangular.

#### BUTOMACEAE

*Hydrocleis standleyi* Steyerl. — aquatic herb with small leaf.  
*Limnocharis flava* (L.) Buch — herb, aquatic, with large leaves.

#### CACTACEAE

- \* *Acanthocereus pentagonus* (L.) B. and R. — long arching stems with heavy short spines, white long tubular flowers, just above beaches and swamp edges.
- \* *Deamia testudo* (Karwinsky) Britt. & Rose — rare epiphytic cactus in the uplands of SRNP that twists thick very spiny stems tightly and convolutedly around vertical and horizontal branches in dense masses, large white flower that turns reddish after blooming.
- \* *Hylocereus costaricensis* (Weber) Britt. & Rose — blue glaucous stems, pendant vine, huge white flowers.
- \* *Lemaireocereus aragonii* (Weber) Britt. and Rose (= *Cereus aragonii*) — the big columnar cactus, small greenish bat-pollinated flower.
- \* *Melocactus maxonii* (Rose) Gurke var. *sanctae-rosae* L. D. Gómez — small round very spiny cactus with pink tubular hummingbird-visited flowers on dry ridges in Santa Rosa National Park.
- \* *Nyctocereus hirschtianus* (K. Schumann) Britt. and Rose — prostrate cylindrical stems on dry slopes, reddish tubular flowers.
- \* *Opuntia elatior* Mill. — common, yellow flower, lowland beach edge (this may be 2 species-one prostrate, other upright (*O. elatior*)).
- *Pereskia nicoyana* Weber — leafy shrub or tree with single long spines from some of the areoles, otherwise spineless (likely an escape from cultivation).

- *Weberocereus glaber* (Weing.) [= *Werckleocereus glaber* (Weing.) B. and R.] – flat-stemmed epiphyte with large white flowers (probably higher elevations).

## CAESALPINACEAE

- Bauhinia divaricata* L. – medium sized tree in moister area north of La Cruz.
- \* *Bauhinia glabra* Jacq. (= *Bauhinia standleyi* Rose) – common deciduous perennial vine to 10 m in deciduous forest, white flowers in dense axillary or alternate clusters, flat torsion-dehiscent dark brown pods 5–10 cm long with 1–5 seeds; only vine *Bauhinia* in lowland Guanacaste.
- Bauhinia pauletia* Pers. – very rare deciduous shrub in patches, to 3 m tall, sharp recurved thorns on stems, greenish white bat-pollinated flowers, flat brown torsion-dehiscent 10–15" pods with 12–22 seeds; only thorny *Bauhinia* in Guanacaste.
- \* *Bauhinia unguolata* L. – common pasture edge deciduous shrubby treelet to 4 m, flat brown torsion-dehiscent 15–30 cm pods with 10–20 seeds, whitish bat-pollinated flowers.
- \* *Caesalpinia bonduc* (L.) R. Br. (= *Guilandina bonduc*; *G. crista* is a misidentification) – scandent upper beach shrub with wicked recurved hooks on leaves and stems; flowers yellow; seeds gray "marbles" in very spiny 1–3 seeded pods.
- \*\* *Caesalpinia coriaria* (Jacq.) Willd. (= *Libidibia coriaria* Schlecht.) – tree occasional along backside of mangroves (SRNP); fruits indehiscent; dark brown ("divi-divi"), very tannin-rich, strongly curled, 2 cm wide, 3–8 cm long.
- Caesalpinia eriostachys* Benth. – deciduous tree with extremely ridged trunk; flowers yellow; fruits dehiscent, 2 cm wide, 5–10 cm long, beige; seeds flat 1.5 cm diameter.
- \* *Caesalpinia exostemma* DC. [= *C. konzatti* (Rose) Standl.] – deciduous tree; flowers yellow and pink-red; leaflets on long petiolets, leaf looks expanded; fruit dehiscent, beige 7–10 cm long; common along streams in lowlands of SRNP.
- *Caesalpinia pulcherrima* (L.) Swartz – ornamental by houses; flowers yellow and red; fruits dehiscent and dark brown.
- \* *Caesalpinia vesicaria* L. – not collected, but reported from SRNP lowlands; pods look in photo like *Lysiloma seemanii*.
- *Caesalpinia bonducella* – probably a misidentification of *C. bonduc*.
- *Cassia alata* L. – introduced shrub with dense upright spikes of yellow flowers; fruits dry, dehiscent, 4-winged lengthwise, cross-shaped in X-section, 10–15 cm long, black; around houses and river banks.
- \* *Cassia biflora* L. – woody slender-stem shrub with yellow flowers; fruit paired; dehiscent dry fruits light brown and flat, 8–12 cm long, 3 mm wide; seeds flat with an x on them; common in pastures. Irwin and Barneby (in litt) report that *Cassia biflora* does not have a type specimen and therefore it may be necessary in the near future to change its name to a name that does have a type.
- \* *Cassia diphylla* L. – herb to 50 cm tall; enormous leaf-like stipules covering nodes; only one pair of leaflets.

- \* *Cassia emarginata* L. — small tree with yellow flowers; mature pods pendulous indehiscent flat black 1.5 cm wide and 10–20 cm long.
- *Cassia fistula* L. — cultivated in Liberia, looks like *C. grandis* with narrow cylindrical pods and light yellow flowers.
- \* *Cassia flexuosa* L. — leaf-like stipules at base of leaves, tiny very numerous leaflets, flowers axillary, upright 2 inch sword-shaped pod, herbaceous.
- \* *Cassia grandis* L. — tree rare in riparian forest in northern Guanacaste, becoming occasional in southern Guanacaste, planted around houses; deciduous with 30–100 cm long, 5 cm diameter indehiscent pods with molasses-like fluid around mature seeds; seeds light brown ivory; flowers pink.
- \* *Cassia hayesiana* (B. and R.) Standl. [= *Cassia maxonii* (Britt. and Rose) Schery, = *Cassia standleyi* (Brit. and Rose) Standl.] — large shrub, 4 fertile stamens, 2 pairs of large leaflets with glands.  
*Cassia kunthiana* Cham. and Schlechtd. (= *Cassia tegara* Auet.) — tiny leaflet like *C. diphylla* but three pairs of leaflets, savanna, herb.
- \* *Cassia leptocarpa* Benth. var. *hirsuta* Benth. — herb to 50 cm tall; beige pods 10–20 cm long, dehiscent on one edge, cylindrical, 3 mm diameter; seeds drum-shaped; extra-floral nectary at base of petiole, leaflets acuminate.
- \* *Cassia obtusifolia* Benth. (= *C. tora* L.) — herb to 1 m tall; beige pods 20–30 cm long, dehiscent on one edge, cylindrical 3–4 mm diameter; seeds rhomboidal-shaped in profile; extra-floral nectary between first pair of leaflets, leaflets bluntly rounded.
- \* *Cassia papillosa* (B. and R.) Standl. — shrub in riparian forest with yellow flowers; fruits dehiscent along one side, seeds imbedded in pulp dried over them; large leaves; like *C. hayesiana* but has 7 fertile stamens.  
*Cassia patellaria* DC. — herb with upright 1 inch sword-like pods, elongate sessile petiolar nectaries, midrib of leaflets eccentric and close to distal margin.
- \* *Cassia skinneri* Benth. — shrub with yellow flowers; mature pods jointed, 5–10 cm long, dark brown, 1 cm wide, flat, indehiscent, breaking easily at joints.
- \* *Cassia stenocarpa* Vog. — herb. with upright 1 inch sword-like pods, stalked petiolar nectaries, resembles *C. patellaria* but midrib of leaflets is subcentric.  
*Cassia tetraphylla* Martyn (= *C. hispidula* Vahl) — hairy stem, herb, hairy pods to 4 cm long, flowers yellow and red and gray, quadrifoliate, medium sized leaflets.
- \* *Cassia uniflora* Mill. — coarse annual herb with small axillary flowers and straight dry dehiscent cylindrical pods 3–4 cm long and 3 mm diameter; near main buildings SRNP.
- *Cassia bacillaris* L. — incorrectly applied to *Cassia papillosa* (B. and R.) Standl.
- *Cassia fruticosa* Mill. — incorrectly applied to *Cassia papillosa* (B. and R.) Standl.
- *Cassia hispidula* Vahl. — incorrectly applied to *Cassia absus*.
- *Cassia leiophylla* Vogel — RCM.
- *Cassia occidentalis* L. — RCM.
- *Cassia reticulata* Willd. — Looks like *C. alata* but does not have winged fruit; this may be a misidentification of *C. alata* and may not occur in Guanacaste, though W. Haber suspects he has seen it near Playa Tamarindo.
- *Delonix regia* (Bojer) Raf. — deciduous tree with large red-orange flowers; pods flat 4 cm wide, 24–75 cm long, woody (introduced, never gone feral).



- \* *Haematoxylon brasiletto* Karst. — spindly tree in SRNP just behind mangrove swamp and on dry ridge above Playa Naranjo; small yellow-red flowers in dense clusters; blunt ended leaflets; fruits 5–10 mm wide, indehiscent beige, dry and 3–6 cm long.
- \* *Hymenaea courbaril* L. — bifoliate leaf large semi-evergreen tree; flowers white bat-visited; reddish hard fruits indehiscent, 5–15 cm long, opened by agoutis.
- \* *Krameria cuspidata* Presl. — shrub with pink and yellow flowers, spiny ball fruits.
- o *Krameria revoluta* Berg. — RCM.
- Parkinsonia aculeata* L. — small shrubby tree with solid green bark, long dropping leaves from which the leaflets fall early, flowers yellow, pods dry beige and indehiscent, swamp tree.
- Schizolobium parahybum* (Vell.) Blake — large deciduous tree with enormous leaves, new shoots sticky; flowers yellow; fruits single-seeded dehiscent with a seed in a winged covering inside.
- \* *Swartzia cubensis* (Britt. and Wilson) Standley — medium-sized evergreen tree with dark green leaves; fruit 1–2 seeded gray-green-brown 2–4 cm long, yellow-red aril exposed when fruit dehisces (but it often falls from the tree first), fruit falls in March-April; rare tree, along creeks at SRNP (previously misidentified as *Swartzia myrtifolia* J. E. Smith).
- o *Tamarindus indica* L. — tree; gray-green foliage; fruits beige, thin-walled, indehiscent.

#### CAMPANULACEAE

(See Lobeliaceae and Sphenocleaceae)

#### CANNACEAE

*Canna* sp. — genus being monographed at present (there is probably only one in lowland Guanacaste).

#### CAPPARIDACEAE

- \* *Capparis frondosa* Jacq. (= *C. baducca* of authors not L.) — very short sepals, short fat pod, unequal lengths of petioles; large, smooth, elliptical pointed leaves.
- \* *Capparis incana* HBK. — almost round fruit, small and tomentose leaves.
- \* *Capparis indica* (L.) Fawc. and Rendle — sepals very short, very long large fruit, red orange on inside, lepidote stellate scales on lower surface of leaves, flowers and on fruit.
- \* *Capparis odoratissima* Jacq. — sepals totally covering petals in bud, common shrub with 7–10 cm fruits in large numbers, silvery foliage.
- \* *Capparis pachaca* HBK. spp. *oxysepala* (Radlk.) Iltis — leaves with short petioles, obtuse at base.
- \* *Capparis verrucosa* Jacq. — leaves on very short petiole, fruits warty, short and fat, on gyno base.

- *Capparis flexuosa* L. — fruit elongate, smooth.
- \* *Cleome guianensis* Aubl. — delicate herb, simple leaves.
- Cleome parviflora* HBK. — has bracts in inflorescence and small spines, 3–5 leaf lobes on larger leaves, flowers greenish white.
- Cleome serrata* Jacq. — no spines, no bracts in inflorescence, flowers white, pods erect, sessile, leaves 3-lobed.
- \* *Cleome spinosa* Jacq. — very spiny, 5-leaf lobes, flowers whitish, pods hairy on long stalk.
- \* *Cleome viscosa* L. — herb, very sticky on surface, flowers deep yellow, pods erect and sessile.
- \* *Crataeva tapia* L. — small tree with trifoliolate leaves; indehiscent fruits 4–8 cm diameter, look like glabrous yellow balls on 5 cm attenuated stalk-like bases, fruit juicy inside.
- Forchhammeria pallida* Liebm. — fruit ovoid, tree, glabrous 5 cm oblanceolate leathery simple leaves, dioecious racemose flowers.
- \* *Morisonia americana* L. — when sterile, similar to *Capparis frondosa* Jacq., but fruit round and petiole short, densely scruphy pubescent.

#### CARICACEAE

- \* *Carica papaya* L. — commercial papaya and small-fruit feral morphs as well.

#### CELASTRACEAE

- Crossopetalum uragoga* (Jacq.) Ktze. — little shrub.
- \* *Maytenis* cf. *jamaicensis* Kr. and Urb. — Understory shrub, nearly oval leathery leaves, oval 1 cm diameter fruit at end of branch. (Probably are more, but we need fertile material).

#### CHRYSOBALANACEAE

(See Rosaceae)

- \* *Hirtella racemosa* Lam. — inflorescence an exploded bottle-brush; nearly sessile symmetrical oval leaves, shrub, 1–2 cm fruit on 1–2 cm pedicel, fruit with weak flanges, glabrous, indehiscent; shrub.
- \* *Licania arborea* Seem. — large somewhat evergreen tree; simple leaves densely rough-tomentose below; fruits green single seeded fleshy 3 cm long ovoid; leaves always look very raggedy.
- Licania platypus* (Hemsl.) Fritsch — tree with elongate large oval leaves, exploded terminal inflorescence.

## COCHLOSPERMACEAE

- \* *Cochlospermum vitifolium* (Willd.) Spreng. — deciduous tree with silvery gray bark; flowers yellow; fruit dehiscent 5 cm long, 4 cm in diameter, filled with fluff with curled flat thick seeds.

## COMBRETACEAE

- Combretum decandrum* Jacq. (= *C. nicoyanum* Pittier) — woody vine with tiny flowers, fruits tend to be widely scattered along the infructescence.
- \* *Combretum farinosum* HBK. — large woody vine with large red  $\frac{1}{2}$  bottle-brush inflorescences, wind-dispersed 4-winged fruits (single-seeded).
- o *Combretum fruticosum* (Loefl.) Stuntz. — vine similar to *C. farinosum*, but with yellow-green inflorescences and more acuminate leaves, occurs in northern Puntarenas Province but not yet from Guanacaste; we do not agree with the Flora of Guatemala that *C. fruticosum* = *C. farinosum*; numerous *C. farinosum* have been misidentified as *C. fruticosum*.
- \* *Conocarpus erectus* L. — dry soil site mangrove with fruits like small conifer cones.
- \* *Laguncularia racemosa* (L.) Gaertn. — mangrove, no stilt roots or pneumatophores, flat blunt 10-ribbed fruits, opposite elongate oval leaves.
- o *Terminalia catappa* L. — beach plant and ornamental, pagoda life-form, fruit like large almond fruits (may have been introduced from Asia by the sea).
- \* *Terminalia chiriquensis* Pittier — large tree in riparian vegetation with pale very smooth bark and somewhat distorted trunk.
- o *Terminalia oblonga* (R. and P.) Steud. — name used for same species as *T. chiriquensis*; with revision, *T. chiriquensis* may be lumped under *T. oblonga*.
- o “*Terminalia lucida*” — an old forester’s name applied in the early days to *T. chiriquensis* at Taboga.

## COMMELINACEAE

- \* *Commelina erecta* L. — herb with white to pale blue flowers, nearly sessile leaves; inflorescences with bract.
- Commelina diffusa* Burm. f. — inflorescence with bract, pedunculate, north of La Cruz.
- Dichorosandra hexandra* (Aubl.) Standl. — shrub with purple-blue fruits, inflorescence panicle without large bract.
- Tripogandra serrulata* (Vahl) Handlos — herb, inflorescence pedunculate several flowered, without a bract.
- Zebrina pendula* Schnizl. — herb, flowers terminal almost sessile.

## COMPOSITAE

- o *Ageratum scabriusculum* (Benth.) Hemsl. — RCM.

- Ambrosia artemisiaefolia* L. – ragweed, leaves deeply lobed.
- Ayapana amygdalina* (Lam.) K. & R. – flowers lavender, leaves rounded at tip.
- Baccharis trinervis* Pers. – shrub to 3 m leaves alternate, stems conspicuously striate, leaves 3 veined, dioecious.
- \* *Baltimora recta* L. (= *Baltimora scolospermum* Steetz) – erect herb, flowers yellow, leaves opposite, rays fertile, achenes 3-angled, pappus a small crown or cup of scales.
- \* *Bidens riparia* HBK. – opposite leaves, trifoliolate leaves, fruit with 1 barb erect and 2 or 3 retrorse.
- *Bidens ostruthoides* (DC.) Schultze var. *costaricensis* (Benth.) – RCM.
- *Bidens pilosa* L. – RCM.
- \* *Blumea viscosa* (Miller) Badillo – herb with strong smelling foliage.
- Calea peckii* Rob.
- \* *Calea prunifolia* HBK. – herbaceous vine to 2 m tall, yellow flowers, flimsy 1–2" long acuminate leaves with wide-spread teeth on margins.
- *Calea urticifolia* (Mill.) DC. – RCM.
- *Calyptocarpus vialis* Les – RCM.
- Chrysanthellum americanum* (L.) Valke var. *integrifolium* (Steetz) Alexand. prostrate herb, yellow flowers, alternate spatulate leaves.
- Clibadium* spp. – difficult to recognize as Compositae.
- Conyza bonariensis* (L.) Cronq. (= *Erigeron bonariensis* L.) – annual, lacking basal leaves, more robust plant than *C. apurensis*.
- \* *Conyza apurensis* HBK. – (= *Erigeron spathulatus* Vahl.).
- \* *Delilia biflora* (L.) Kuntze [= *Elvira biflora* (L.) DC. = *Delilia berteria* Spreng.] – achenes look like oatmeal, doesn't look much like a composite.
- \* *Dyssodia montana* (Benth.) Gray – perennial herb to 1 m, leaves opposite, petiole lanceolate to 6 cm long, to 3 cm wide, with black dots or glands, capitula solitary on long peduncles, rays orange, phyllaries with black dots or glands.
- Eclipta alba* (L.) Hassk. – leaves opposite, rays small and inconspicuous, achenes abconical, warty, pappus of low fused corona and 1 or 2 aristiform awns.
- Egletes viscosa* (L.) Less. – annual, viscid-villous throughout, flowers yellow, usually in waste places.
- Elephantopus mollis* HBK. – cluster of heads surrounded by about three bracts.
- Eleutheranthera ruderalis* (Swartz) Sch. – Bip. – annual herb, leaves opposite, strigose discoid corollas yellow, achenes tuberculate, pappus reduced to small tube.

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#### KEY

- \*: Known to grow in Santa Rosa National Park.
- RCM: Names used as a very probable misidentification of a plant collected at Santa Rosa National Park by Ross Callaway; these names usually apply to plants in Mexico or northern Central America, or from wetter sites in Costa Rica.
- : Questionable determination, name use, geographic origin, etc.
- : Cultivated or ornamental in Guanacaste.

- \* *Emilia fosbergii* Nicolson – herb, lower leaves dentate, 1–4 headed at ends of 30 cm long peduncles, corollas pink, exceeding involucre greatly, corolla lobes 1.0 mm or longer.  
*Emilia sonchifolia* (L.) DC. – corolla equally or only slightly exceeding involucre, corolla lobes less than 1.0 mm long.
- o *Enhydra sessilis* (Sw.) DC. – RCM.
- Erechtites hieracifolia* (L.) Raf. ex DC. – leaves cauline, petiolate, shallowly lobed, pappus white.
- Erechtites valerianaefolia* (Wolf) DC. – leaves deeply divided, pappus reddish.
- o *Erechtites agrestis* (Sw.) Standl. and Steyerl. – RCM.
- Erigeron pusillus* Nutt. – very similar to *Conyza*.
- Espejoa mexicana* DC. (= *Jaumea mexicana* Benth. and Hook.) – leaves sessile, clasping, opposite.
- Eupatorium capillipes* Benth.
- \* *Eupatorium collinum* DC. [= *Chromolaena collina* (DC.) K. & R.].
- Eupatorium macrophyllum* L. [= *Hebeclinium macrophyllum* (L.) DC.].
- Eupatorium morifolium* Mill. [= *Critonia morifolia* (Mill.) K. & R.].
- \* *Eupatorium odoratum* L. [= *Chromolaena odorata* (L.) K. & R.].
- \* *Eupatorium oerstedianum* Benth. [= *Chromolaena oerstediana* (Benth. ex Oerst.) K. & R.].
- \* *Eupatorium quadrangulare* DC. [= *Critonia quadrangulare* (DC.) K. & R.] – huge herb with flanged square stem in cross-section.
- Galeana pratensis* (HBK.) Ryab. – small annual herb, opposite leaves, flowers yellow (looks like a Scrophulariaceae).
- \* *Isocarpha atriplicifolia* (L.) R. Br. – erect annual, inflorescence to 0.5 cm long, leaves ovate to rhombic-ovate, not 3-nerved, involucre cylindrical, flowers white, no pappus.
- \* *Lagascea mollis* Cav. – slender annuals, 20–50 cm tall, stems pilose, leaves opposite, rhombic-ovate, disc corolla pale yellow-white.
- \* *Lasianthaea fruticosa* (L.) K. Becker [= *Zexmania frutescens* (Miller) Blake] – shrub, leaves opposite, terminal cymose inflorescence of many heads, rays yellow.
- Melampodium divaricatum* (Rich.) DC. – small herbs, leaves opposite, rays fertile, yellow-flowered, ray achene large, phyllaries 5, connate at bases.
- \* *Melanthera aspera* (Jacq.) Small – leaves opposite often hastate, flowers white, chaff with mucro, persistente, anthers black.
- \* *Mikania micrantha* HBK. – opposite leaves, vine, involucre of 4 phyllaries, 4 flowers per head.
- Millieria quinqueflora* L. – herb, leaves opposite, petiolate leaves, ray flowers (one) pistillate and-fertile, ligule yellow, achenes obovate appearing oblique on receptacles.
- Montanoa xanthiifolia* Sch. Bip. ex C. Koch – small tree or shrub.
- Notoptera scabridula* Blake – erect shrub, leaves opposite, strigillose, lanceolate, slightly denticulate, inflorescence cymose paniculate, heads small and campanulate, achenes about 3 mm long with one pronounced wing.
- Onoseris onoseroides* (HBK.) Robins. (= *O. silvatica* Greenm.) – herbaceous shrub 1–3 m tall, leaves discoloured (bright green above, whitish tomentose be-

low), capitula large to 3 cm tall and 3 cm wide, corollas red or purplish, corollas bilabiate.

*Pectis bonplandiana* HBK.

*Pectis polyantha* Rydb.

*Pectis saturejoides* (Mill.) Sch. — Bip. in Seem.

○ *Pectis capillaris* L.

○ *Pectis capillipes* (Benth.) Hemsl. — RCM.

*Perymenium grande* Hemsl. var. *nelsonii* (Robins and Greenm.) Fay — Shrub or small tree, leaves opposite, phyllaries (persistent) ovate, chaff persistent, lower surface of leaves granular, soft pubescent.

*Pluchea symphytifolia* (Miller) Gillis [= *Pluchea carolinensis* (Jacq.) G. Don = *Pluchea odorata* sensu Godfrey).

\* *Porophyllum ruderale* (Jacq.) Cass. subsp. *macrocephalum* (DC.) R. R. Johnson — involucre 2 cm tall, very odoriferous plant, herb.

\* *Porophyllum punctatum* (Mill.) Blake — shrub with large notches in leaf.

\* *Pseudelephantopus spicatus* (Juss.) Rohr — spike of heads, achenes with two doubly bent awns.

*Sclerocarpus divaricatus* (Benth.) Hemsl. — herb to 1.5 m tall, leaves opposite ovate to lanceolate, denticulate, disc corollas yellow, long, sterile, rays yellow and fertile, about 5, achene ovoid.

*Senecio chenopodioides* HBK. — vine, leaves lanceolate, to 12–15 cm long, to 6 cm wide, dentate, heads large, rays orange to red.

*Simsia foetida* (Cav.) Blake — heads 7–12 mm wide (excluding rays), achenes 4–5 mm long.

\* *Simsia gradiflora* Benth. ex Oersted. — stem hirsute, principal leaves opposite, leaves sessile and clasping stem, capitula to 2.5 cm wide, excluding rays, 10–20 rays, yellow, disk yellow, chaff persistent, achenes compressed with 2 weak awns, 5–7 mm long.

*Sonchus oleraceus* L. — RCM.

*Spilanthes ocymifolia* (Lam.) A. H. Moore (= *Spilanthes alba* L'Her.).

*Spilanthes uliginosa* Sw.

\* *Spiracantha cornifolia* HBK. — discolorous leaves, axillary sessile heads, achenes with horns.

*Synedrella nodiflora* (L.) Gaertn. — leaves opposite, heads yellow, sessile and axillary.

*Tithonia diversifolia* (Hemsl.) Gray — alternate leaves, three-lobed to unlobed, flowers yellow, heads robust.

\* *Trocospira verticillata* (L.) Blake — small opposite discolorous leaves (white tomentose below), flowers distichous in leaf axils.

*Tridax procumbens* L. — sprawling on open spaces, perennial from woody base, leaves opposite, scabrous, 2–7 cm long, ray florets pale yellow or white, disk corollas yellow.

*Trixis inula* Crantz [= *Trixis radialis* (L.) Kuntze] — small shrub, corollas bilabiate, yellow, leaves ovate to elliptic, old involucre spreading, achenes glandular and hispidulous pappus of many yellow bristles.

- Verbesina tonduzii* Greenm. — shrub, stems 4-winged from decurrent petiole bases, leaves opposite, ovate, sometimes weakly 3-lobed, basally cuneate, with winged petiole, capitula about 1 cm x 1 cm, achenes winged, two persistent awns on each seed, florets orange.
- \* *Verbesina gigantea* Jacq. (= *V. myriocephala* Sch. — Bip.) — coarse herb to 3 m tall, leaves to 30 cm long, 15 cm wide, pinnately lobed, capitula smaller to 0.5 cm wide; stem round in cross-section.
- Vernonia argyropappa* Buck — small annual to 0.5 m tall, leaves alternate, elliptic to 3 cm long, to 2 cm wide, capitula solitary in axils, on one side of stem, capitula 7 mm tall, 5 mm wide.
- Vernonia patens* HBK. — inflorescence multi-headed, paniculate-scorpoid, capitula small, involucre less than 5 mm tall, 5 mm wide.
- Vernonia vernicosa* Klott — capitula large, to 1 cm tall and 1 cm wide, solitary in leaf or bract axils.
- o *Viquiera dentata* (Cav.) Spreng. — RCM.
- Wedelia calycina* L. C. Rich. or *Wedelia acapulcensis* HBK. — Missouri is using the first name and the Field Museum is using the second name for the same species.
- Wedelia hispida* (HBK.) Gray [= *Zexmenia hispida* (HBK.) Gray].
- Wedelia eatingii* D'Arcy.
- Wedelia longipes* (Benth).

#### CONNARACEAE

- \* *Rourea glabra* HBK. — compound leaf shrub with 1–2 cm long asymmetrical eggplant-like fruits in sprays.

#### CONVOLVULACEAE

- Aniseia martinicensis* (Jacq.) Choisy — herbaceous vine with white flowers, narrow non-cordate leaf, large cordate bracts.
- \* *Bonamia* sp. — similar to *B. sulphurea* but leaves narrower and much less tomentose.
- Bonamia sulphurea* (Brandeg) T. Myint (= *Breweria sulphurea* Brandeg) — densely tomentose roundish small leaves, big terminal sprays of flowers.
- \* *Convolvulus nodiflorus* Desv. (= *Jacquemontia nodiflora* Desv.) — tomentose leaves, clusters of small white flowers, small bracts, 1–2 cm petiole on leaf, spearhead base leaf.
- \* *Cuscuta glandulosa* (Engelm.) Small (= *C. obtusiflora* var. *glandulosa* Engelm. fide Yuncker) — dodder, common orange vine without leaves.
- \* *Cuscuta* — second species is present.
- Note: names in *Cuscuta* are always doubtful.
- Evolvulus alsinoides* (L.) L. — small herbaceous shrub with small blue flowers, tiny elongate leaves.
- Evolvulus filipes* Mart.
- \* *Evolvulus nummularius* (L.) L. — round tiny leaves.

- \*? *Evolvulus sericeus* Sw. — may be a RCM misidentification; has very short pedunculate flowers.
- \* *Evolvulus tenuis* Mart. — comparatively large very hairy leaves..
- o *E. alsinoides* and *E. filipes* are likely to be one rather variable weedy species.
- \* *Ipomoea alba* L. [= *Calonyction aculeatum* (L.) House] — large vine with thick stems with fleshy tubercles all over, large white flowers, large fleshy base on the flowers.
- \* *Ipomoea carnea* Jacq. — the scandent shrub to small tree with large white flowers and enormous hirsute leaves, in patches in lowland swamps of COMELCO and SRNP (in S. America and eastern Panama, intergrades with *I. fistulosa*).  
*Ipomoea fistulosa* Mart. ex Choisy — the shrub to 1 m tall with lavender and purple large flowers and heavily galled leaves, in the swamp in front of Palo Verde, COMELCO.
- \* *Ipomoea hederifolia* (L.) G. Don. [= *Quamoclit hederifolia* (L.) G. Don] — red flower, individual fruits round with narrow bracts and on a long stalk.
- \* *Ipomoea meyeri* (Spreng.) G. Don — elongate spatulate calyx lobes that turn black on drying, blue flowers in clusters.  
*Ipomoea minutiflora* (Mart. and Gal.) House — tiny leaves and flowers.
- \* *Ipomoea nil* (L.) Roth — herbaceous vine with tri-lobed leaves; blue large flowers with a white center; 2–3 cm long calyx bracts, very hairy.  
*Ipomoea pes-caprae* (L.) Sweet — the ocean beach dune morning glory herbaceous vine with purple flowers.
- \* *Ipomoea trifida* (HBK.) Don — herbaceous vine with light lavender outer and dark purple inner flower, wide corolla tube visited by *Ptiloglossa* bees; tri-lobed leaves; sometimes confused with *Ipomoea batatas*.
- \* *Ipomoea purga* (Weder.) Hayne — flowers in leaf axils and leaf wraps around flower base, large purple single flowers.  
*Ipomoea setosa* Ker. — stem hairy with thin 3–5 mm long trichomes.
- \* *Ipomoea umbraticola* House — square stem, large lavender flowers.
- o *Ipomoea asarifolia* (Desr.) Roem. and Schult — RCM.
- o *Ipomoea hirsutula* Jacq. — RCM. this name is a taxonomic synonym of *I. hederifolia* but plants of *I. nil* and *I. indica* are often misidentified with this name.
- o *Ipomoea squamosa* Choisy — RCM.
- \* *Jacquemontia mexicana* (Loesener) Standl. — large flat heart-shaped bract around each flower, vine.
- \* *Jacquemontia pentantha* (Jacq.) G. Don [= *Jacquemontia canescens* (HBK.) Benth.] — tight clusters of little flowers, small leaves, vine.  
*Jacquemontia sphaerostigma* (Cav.) Rusby — tiny blue flowers and leaves, vine.
- \* *Jacquemontia tamnifolia* (L.) Griseb. — inflorescence a very dense hairy head, vine.
- \* *Merremia aegyptica* (L.) Urban — herbaceous vine with white flowers and palmately compound very hairy leaves and stem; seeds are smooth, brown, and round.
- \* *Merremia cissooides* (Lam.) Hallier — palmately compound glabrous leaves.
- \* *Merremia umbellata* (L.) Hall. f. — herbaceous vine with bright yellow flowers in large clusters; fruit clusters dark brown and smooth fruits.



- \* *Operculina pteripes* (Don) O'Donell – herbaceous vine with salmon pink hummingbird (?) visited flowers; strongly winged peduncle bearing fruits and flowers. *Operculina alata* (Vahl.) Urban – herbaceous vine with yellow flowers with winged peduncle [*O. triquetra* (Ham.) previously misapplied to this species].

## CUCURBITACEAE

- \* *Cayaponia attenuata* (Hook. and Arn.) Cogn. – herbaceous annual (at least above ground) vine with 3–5 lobed leaves and round 1–2 cm diameter yellow indehiscent fruits; common climber over low shrubs in open marshes and second growth.
  - \* *Cayaponia racemosa* (Sw.) Cogn. – herbaceous annual (at least above ground) vine with unlobed or lobed leaves and oval 2 cm long red to yellow indehiscent fruits; rare climber to 3 m height (common in SRNP forest).
  - *Citrullus vulgaris* Schrad. – watermelon.
  - \* *Cucumis anguria* L. – low vine with rough, lobed leaves, green fruit with spiny warts, fruit hangs in wind and seeds blow out. *Cucumis dipsaceus* Ehrenb. ex Spach. – as in *C. anguria* but leaves only slightly lobed and fruit densely spiny.
  - \* *Luffa aegyptiaca* Mill. [= *Luffa cylindrica* (L.) Roem.] – five lobed leaf, dishrag gourd (large when in gardens, 2 inches long on wild plants) (perhaps an escape from cultivation).
  - Melothria pendula* L. [= *Melothria guadalupensis* (Spreng.) Cogn.] – small glabrous fruit with small flowers and small leaves.
  - \* *Melothria trilobata* Cogn. – large 5-lobed leaves with smooth ovoid fruits, 4–5 cm long.
  - Momordica charantia* L. – orange, tubercled fruit that splits to expose red aril around black seeds, apparently introduced from Africa.
  - Psiguria warscewiczii* (Hook. f.) Wunderlin – herbaceous large vine with orange-petaled flowers (*Psiguria warscewiczii* used to be called *Anguria warscewiczii*).
  - \* *Rytidostylis carthaginensis* (Jacq.) Kuntze (= *Elaterium ciliatum* Cogn.) – small flexuous-spiny asymmetrical fruit.
  - \* *Sicydium tamnifolium* (HBK.) Cogn. – leaf margins entire, flowers or fruits in dense panicles, fruits green and 1-seeded.
- Note: one cream-flowered Loasaceae – *Gronovia* – is often mistaken for a cucurbit.

## CYPERACEAE

### ABILGAARDIA VAHL

- Abilgaardia ovata* (Brumann f.) Kral, Sida Contrib. to Bot., Vol. 4, 2:72. 1971.  
*Abilgaardia monostachys* (L.) Vahl, Enum. 2:296. 1805.  
*Fimbristylis monostachya* (L.) Hassk., Pl. Jav. Rar. 61. 1848.

Perennial, solitary or tufted, bulbous-base; spikelets solitary at the tip of the scapes. Savannas.

#### *BULBOSTYLIS* KUNTH Nomen conservandum

*Bulbostylis junciformis* (HBK) Lindman, Bih. Sv. Vet. —Akad. Handf. 26 Afd. 3 No. 9:19. 1900.

Plants perennial, solitary or in small tufts, up to 30 cm tall; spikelets subsessile in a dense ascending fan-like system made up of several primary rays terminating in small glomerules, the whole inflorescence much longer than broad. Savannas.

*Bulbostylis paradoxa* (Sprengel) Lindman, Bih. Sv. Vet.-Akad. Handl. 26 Afd. No. 9:17. 1900.

Perennial, usually forming very large and dense, hard clumps, arising from a stout caudex, this covered by a persistent stubble of burned leaf bases; spikelets solitary at the tips of the culms. Savannas.

*Bulbostylis tenuifolia* (Rudge) Macbride, Field Mus. Publ. Bot. 11:5. 1931. Plants chiefly annual, in small tufts, up to 12 cm tall; spikelets in simple umbellate cymes. Savannas.

#### *CYPERUS* LINNAEUS

*Cyperus articulatus* L. Sp. Pl. 44. 1753.

Easily recognized by its terete, spongy septate-nodose culms; leaves reduced to a few sheaves. Growing in shallow water or wet soil.

*Cyperus compressus* L. Sp. Pl. 46. 1753.

A low annual; inflorescence a simple umbel. Very common on beaches, coastal dunes and sandy soil.

\* *Cyperus distans* L. f.

Perennial with stolons; culms trigonous, up to 60 cm tall; inflorescence compound, spikelets divaricate; achenes oblong. Savannas.

First record for Costa Rica (Santa Rosa National Park, Ross Callaway No. 281).

*Cyperus esculentus* L. Sp. Pl. 45. 1753.

Perennial with slender stolons, these termination in globose or ovoid tubers; glumes pale brown or yellowish. In wet soil or more common on beaches.

*Cyperus haspan* L.

Annual or perennial with culms trigonous, soft and weak; leaves reduced to a few purplish sheaths, 2 unequal bracts. Marshes or wet savannas.

*Cyperus imbricatus* Retzius, Obs. Bot. 5:12. 1789.

Perennial with very short rhizome, plant robust up to a meter tall; spikes corymbose fasciculate, cylindrical, dense. Shallow water or wet soil.

*Cyperus Luzulae* (L.) Retzius.

Perennial, the culms usually caespitose, stout; the spikes in the end of the rays

forming dense heads. A very common sedge; along streams, rivers banks, swamps and marshes.

*Cyperus rotundus* L. Sp. Pl. 45. 1753.

A low perennial with stolons; the culms slender, up to 40 cm tall; glumes reddish brown. A common weedy plant of cultivated and waste places, more frequent along seashore.

*Cyperus surinamensis* Rottboell, Descr. & Icon. 35. 1773.

Perennial with short rhizomes; the culms stout, scabrous on the angles; spikelets congested in dense heads; glumes cellular-reticulate, stramineous. In swamps, streams and wet soil.

*Cyperus tenerrimus* Presl, Reliq. Haenk. 1:166. 1828.

A low perennial; the culms caespitose, very slender; inflorescence consisting of a single dense head; glumes dirty white. Seashore, streams, sandy soil, cultivated places.

\* *Cyperus uncinulatus* Schrader ex Nees in Martius.

Perennial with short rhizomes; culms compressed-trigonous, up to 12 cm tall; bracts 3–4, longer than the inflorescence, this capitate, subglobose, dense, 5–10 mm in diameter. Savannas.

First record for Costa Rica (Santa Rosa National Park, Ross Callaway No. 345).

#### ELEOCHARIS R. BROWN

*Eleocharis atropurpurea* (Retzius) Kunth.

Small annual, caespitose; culms capillary, usually less than 6 cm tall; achenes lenticular, lustrous black, with translucent bristles. In mud or wet places.

First record for Costa Rica ("Seasonal swamp". Comelco, 5 km N. W. of Bagaces, 150 m elev., P. A. Opler No. 932.

*Eleocharis elegans* (HBK.) Römer & Schultes, Syst. Veg. 2:150. 1817.

*Eleocharis geniculata* Römer & Schultes, Syst. Veg. 2:150. 1817.

Perennial from creeping rhizomes; the culms terete, spongy, green, up to 150 cm tall; spikelet usually acute; glumes thin. Marshes, swamps, strams and wet soil.

*Eleocharis caribaea* (Rottboell) Blake, Rhodora 20:24. 1918.

Perennial, caespitose with slender, firm culms, up to 30 cm tall; spikelets subglobose or ovoid; glumes yellow to pale brown. Marshes, often in mud along streams.

*Eleocharis interstincta* (Vahl) Römer & Schultes, Syst. Veg. 2:149. 1817.

Perennial, the culms stout, terete, up to 1 m tall; the rhizomes thick; spikelets cylindrical. Marshes or along streams.

*Eleocharis mutata* (L.) Römer & Schultes, Syst. Veg. 2:155. 1817.

Perennial, the culms stout, acutely trigonous, up to 1 m tall; spikelets cylindrical; glumes stramineous. In swamps or wet places.

### FIMBRYSTYLIS VAHL

*Fimbristylis annus* (Allioni) Römer & Schultes, Syst. 2:95. 1817.

*Fimbristylis dichotoma* of many authors, not Vahl.

Annual: caespitose, usually erect, up to 30 cm tall with variable pubescence; achene often verrucose. Moist sunny places, roadsides and waste places.

*Fimbristylis dichotoma* (L.) Vahl, Enum. 2:287. 1805.

Tufted perennial, up to 50 cm tall; usually glabrous or sparsely pilose; achene conspicuously striate-reticulate. A common plant of moist soil, grasslands and river banks.

*Fimbristylis miliacea* (L.) Vahl, Enum. 2:287. 1805.

Annual caespitose, up to 50 cm tall; spikelets subglobose in a compound loose system of pedicellate cymes; style 3-branched. River shores, swamps, thickets and wet fields.

*Fimbristylis spadicea* (L.) Vahl, Enum. 2:294. 1806.

*Fimbristylis castanea* sensu Böckeler in herb.; C. B. Clarke, Contrib. U. S. Nat. Herb. 10:443–471. 1908; Standley, Field Mus. Bot. 8:239–292. 1931; Field Mus. Bot. 18, Part 1, Pp. 102. 1937.

Perennial, densely caespitose, up to 1 m tall; spikelets in a paniculate system of cymes. A very common sedge on the coastal marshes.

### KYLLINGA ROTTBOELL

*Kyllinga pumila* Michaux, Fl. Bor. Amer. 1:28. 1803.

Annual, densely caespitose, up to 40 cm tall; bracts 3–4, unequal, similar to the leaves; spikelets in mostly solitary heads. A common plant in moist thicket, grasslands, along streams and waste places.

*Scirpus cubensis* Poeppig & Kunth in Kunth, Enum. Pl. 2:172. 1837.

Perennial with scaly stolons; bracts several, similar to the leaves; spikelets capitate with peduncles of variable length. Floating in shallow water or attached to wet soil in swamps and marshes.

### MARISCUS GAERTNER

*Mariscus hermaphroditus* (Jacquin) Urban, Symb. Antill. 2(1): 48. 1900. *Cyperus hermaphroditus* (Jacquin) Standley, Contrib. U. S. Nat. Herb. 18:88. 1916.

Perennial, rhizome short; bracts several, unequal; spikes dense or lax, cylindrical, in elongate rays. In cultivated grounds, disturbed forests, thickets and waste places.

*Mariscus ligularis* (L.) Urban, Symb. Antill. 2(1):165. 1900. *Cyperus ligularis* L., Pl. Jam. Pugill. 3. 1759. *Mariscus rufus* HBK., Nov. Gen. & Sp. 1:216. pl. 67. 1815.

Perennial with thick rhizomes; culms stout and stiff, up to 1 m tall, leaves septate-nodulose, papillose, very rough; spikes in dense clusters, reddish brown. A very common plant on the sea-coast, beaches and salt-marshes.

*Mariscus mutissi* HBK., Nov. Gen. et Sp. Pl. 1:216. 1815. *Cyperus incompletus* (jacquin) Link, Hort. Berol. 1:319. 1827. *Cyperus mutisii* (HBK.) Grisebach, Fl. Brit. W. Ind. 587. 1864.

Perennial with short rhizomes; culms usually stout, up to 1 m tall; the rays with several digitate spikes at the apex, this cylindrical, with lateral shorter spikes. Frequently at disturbed areas, cultivated fields and moist thickets.

*Mariscus pallens* Liebmann, Vidensk. Selsk. Skr. Kjoebenhavn. 5 ser. 2:230. 1851. *Cyperus pallens* (Liebmann) Standley & Steyermark, Fieldiana: Bot. 24(1):133. 1958.

Perennial, rhizome short, the culms cespitose, up to 30 cm tall; spikes oblong-cylindrical in very short rays. A not common sedge of the sea-coast.

#### OXYCARIUM NEES

*Oxycarium cubense* (Poeppig & Kunth) K. Lye, Bot. Notiser 124:280-286. 1971.

#### PYCREUS P. BEAUVOIS

*Pycreus albomarginatus* Nees, in Mart. Fl. brasil. II. 1. 1842. *Cyperus albomarginatus* Mart. & Schrad. ex Nees, in Mart. Fl. brasil. II. 1. 1842. Annual, culms stout, up to 1 m tall; bracts several, longer than the inflorescence; spikes lax; glumes with a conspicuous white-hyaline margin. In shallow water and wet soil.

*Pycreus densus* (Link) Urban, Symb. Antill. 2:164. 1900. *Cyperus lanceolatus* Poirlet in Lamarck, Encycl. 7:245. 1806.

Perennial, caespitose, the culms slender; bracts several, unequal; glumes stramineous; rachilla not winged. Often in river shores and wet soil.

*Pycreus polystachyos* (Rottboell) P. Beauvois, Fl. d'Oware 2:48, t. 86, f. 2. 1807. *Cyperus polystachyos* Rottboell, Descr. et Icon. 39. 1773.

Perennial, the culms slender, up to 40 cm tall; glumes stramineous; rachilla zigzag, winged. Wet soil, mud and river banks.

#### RHYNCHOSPORA VAHL

*Rhynchospora barbata* (Vahl) Kunth, Enum. 2:290. 1837.

Perennial, caespitose, tufted, up to 40 cm tall; bracts short; spikelets in a dense single head. Savannas.

*Rhynchospora holoschoenoides* (L. C. Richard) Herter, Rev. Sudamer. Bot. 9(5):157. 1953. *Rhynchospora cyperoides* Martius, Denkschr. Akad. Wiss. München 6:149. 1816–17.

Perennial, up to 1 m tall; spikelets in several paniculate heads. Common in savannas and temporary marshes.

*Rhynchospora micrantha* Vahl, Enum. 2:231. 1806.

Annual, caespitose, slender, up to 30 cm tall; spikelets in several corymbs. In wet soil and temporary marshes.

*Rhynchospora nervosa* (Vahl) Böckeler ssp. *ciliata* (Vahl) T. Koyama, Madroño 20(5) 1970. *Dichromena ciliata* Vahl, Enum. 2:246. 1806.

Perennial in dense clumps; the culms wiry; bracts white at the base; spikelets crowded in a terminal head. Disturbed areas, roadsides, grasslands and savannas.

*Rhynchospora tenuis* Link.

Perennial; culms caespitose, erect and rather stiff, up to 40 cm tall; inflorescence corymbose. Savannas.

First record for Costa Rica ("Small dried up marsh in open savanna". 2 km E of Carretera Interamericana on road to Las Animas, elev.: 200 m; Davidse & Pohl No. 1373.

#### SCLERIA BERG

*Scleria lithosperma* (L.) Swartz, Prodr. Veg. Ind. Occ. 18. 1788.

Perennial, rhizome short; culms slender up to 40 cm tall; inflorescence branched; hypogynium none; achene white, smooth. Savannas.

*Scleria microcarpa* Nees, Linnaea 9:302. 1834.

Perennial, up to 1 m tall, with horizontal rhizomes; inflorescence paniculate; hypogynium present, conspicuous at the base of the achene; this white, smooth, umbonate. In wet soil or marshes.

*Scleria micrococca* (Liebmann) Steudel, Syn. Pl. Cyp. 179. 1855.

Annual, culms erect, up to 50 cm tall; inflorescence paniculately branched; hypogynium present; achene white, inconspicuously reticulate or verrucose. In temporary marshes or wet soil.

*Scleria nutans* Willdenow ex Kunth, Enum. 2:352. 1937.

*Scleria hirtella* Swartz, Prodr. Veg. Ind. Occ. 19: 1788.

Perennial, with horizontal rhizomes; culms very slender, up to 50 cm tall; inflorescence interruptedly glomerulate-spicate; hypogynium none; achene white, smooth. Wet field and temporary marshes.

#### TORULINIUM DESVAUX IN HAMILTON

*Torulinium odoratum* (L.) S. Hooper, Kew Bull. 26:579. 1972. *Cyperus odoratus* L., Sp. Pl. 46. 1753. *Cyperus ferax* L. C. Richardson, Act. Soc. Hist. Nat. Paris 1:106. 1792.

Perennial, the culms stout, up to 1 m tall, incrassate at the base; bracts several, foliose; umbel compound; rachilla breaking up into 1-fruited joints; glumes usually reddish-stramineous. A very common and variable sedge; thickets, roadsides, rice fields, etc.

Note: The Cyperaceae have not been flagged (\*) for presence in SRNP.

#### DILLENiaceae

- \* *Curatella americana* L. — shrubby tree on rocky exposed sites; bright green leaves, sandpapery and corrugated; flowers white; fruits dehiscent, covered with nasty dense hairs.
- \* *Davilla kunthii* St. Hil. — large woody vine with very sandpapery leaves, “fruit” is round and pea-sized (2 sepals form a round fruit-like structure); more small axillary infrutescences along a branch, blunt leaves, almost entire leaf margins without teeth.
- \* *Tetracera volubilis* L. — large woody vine with acuminate tips on star-shaped pea-sized “fruit”; large terminal-infrutescences; leaves almost acute with sharp teeth on leaf edges (*D. kunthii* and *T. volubilis* are often confused when sterile; correlation of bark color with fruit will eliminate the problem as one has white and red bark, the other red bark).

#### DIOScoreaceae

- \* *Dioscorea convolvulacea* C. and S. — vine with variable colored leaf-solid green to green and white.
- \* *Dioscorea* sp.

#### EBENaceae

- \* *Diospyros nicaraguensis* Standl. — tree with 2 cm diameter yellow somewhat fibrous persimmons.

#### ELAEoCarpaceae

- \* *Muntingia calabura* (Swartz) DC. — shrubby tree with white flowers and red 1.5 cm diameter juicy glabrous globular fruits with tiny seeds.
- \* *Sloanea terniflora* (Moc. and Sesse) Standl. — evergreen riparian tree; fruits densely purple-black velvet outside, 2 cm long, dehiscent, red dangling seed with aril inside.

## ERYTHROXYLACEAE

- \* *Erythroxylon havanense* Jacq.
- Erythroxylon lucidum* HBK.
- Erythroxylon rotundifolium* Lunan — All sent to T. Plowman, Field Museum, Chicago, who is monographing them and names will change.

## EUPHORBIACEAE

- \* *Acalypha alopecuroides* Jacq. — terminal fuzzy foxtail inflorescences, herb.
- Acalypha arvensis* Poepp. and Ednl. — axillary inflorescences, herb.
- Acalypha diversifolia* Jacq. — axillary catkins, thin, not furry brushes, large acuminate leaves, female flowers on base on catkins.
- \* *Acalypha garnieri* Standl. and Steyrm. — elongate delicate catkins, large.
- Acalypha* aff. *macrostachys* Jacq. — large leaves.
- Acalypha polytachya* Jacq. — herb with large leaves, big 5–15 cm catkins.
- *Acalypha schiedeana* Schlecht — RCM.
- Argythamnia guatemalensis* Muell. Arg. [= *Ditaxis guatemalensis* (Muell. Arg.) Pax and Hoffm.].
- \* *Bernardia nicaraguensis* Standl. — woody shrub with short fat axillary catkins, leaves look like alder leaves.
- Bernardia* sp.
- Caperonia castaneifolia* (L.) St. Hil. — herb with thick stem, 3 inch narrow dentate leaves.
- \* *Caperonia palustris* (L.) St. Hil. — herb with white flowers, leaves oval 1–2 inches long, flowers on 1 inch peduncle.
- \* *Chamaesyce densiflora* (Kl. and Gke.) Millsp. — very tightly clustered leaves and inflorescences.
- Chamaesyce dioeca* (HBK.) Millsp. — minute leaves.
- Chamaesyce hirta* (L.) Mill sp. — herb with opposite leaves in one plane, dense inflorescences in axils.
- \* *Chamaesyce hypericifolia* (L.) Millsp. (= *Euphorbia hypericifolia* L.).
- \* *Chamaesyce hyssopifolia* (L.) Small (= *Euphorbia brasilensis* Lam.).
- Chamaesyce lasiocarpa* (Kl.) Arthur — similar to *C. hyssopifolia* but it has a pubescent ovary.
- \* *Chamaesyce thymifolia* L. (= *Euphorbia thymifolia* L.) — minute leaves, in dense cluster of branches, small herb.
- Note: *C. hyssopifolia* and *C. hypericifolia* are very difficult to separate.
- \* *Cnidoscolus aconitifolius* (Miller) I. M. Johnston — big leaves with few or no urticating hairs, leaves most deeply lobed.
- \* *Cnidoscolus urens* (L.) Arthur (= *Jatropha urens* of old) — *mala mujer*, very urticating hair, leaves less deeply lobed.
- *Codiaeum variegatum* Blume — “South Pacific croton”; yucca-looking garden fence plant with yellow and green large thick leaves (introduced).
- Croton* sp. aff. *cortesianus* HBK. — (Haber 30, COMELCO) leaves stellate tomentose on underside.



- \* *Croton costaricensis* Pax. — woody low shrub with smallish leaves.
- \* *Croton elaeagnoides* Wats. — lepidote scales on leaves.
- \* *Croton hirtus* L. Her. — herb with very hairy flimsy stem.
- \* *Croton juigalpensis* Standl. and L. Wms. — no lepidote scales but is shrubby tree.
- \* *Croton lobatus* L. — leaves 5-lobed, like miniature *manihot* leaves.
- \* *Croton reflexifolius* HBK. — lepidote scales on underside of leaves, shrubby tree (difficult to separate from *Croton niveus* Jacq., if it is indeed different).
- Croton schiedeanus* Schlecht. — west of Nicoya.
- Croton xalapensis* HBK. — west of Nicoya.
- *Croton glandulosus* L. — RCM.
- \* *Dalechampia scandens* L. — vine with large trilobed leaves.
- \* *Dalechampia tiliifolia* Lam. — vine with large often not trilobed leaves.
- \* *Euphorbia astroites* Fisch. & Mey. — small round leaves, mostly alternate.
- \* *Euphorbia colletioides* Benth. — whorled leaves, narrow leaves, short petioles.
- Euphorbia graminea* Jacq. — leaves in inflorescence much narrower than other leaves, leaves alternate.
- \* *Euphorbia schlechtendalii* Boiss. — very perfect oval small leaves in whorls on 1–2 cm petiole, reddish stems.
- \* *Garcia nutans* Vahl in Rohr — shrub in understory of largely evergreen forest, flowers purple and white, dioecious.
- \* *Hippomane mancinella* L. — evergreen, shrubby, swamp and beach edge tree with green fleshy 2–3 cm diameter fruits with a single multi-seeded nut, poisonous latex.
- \* *Hura crepitans* L. — deciduous tree with spines on the trunk; leaves simple; fruit explosive dehiscent 6 cm diameter, leaves claw-like structures as fragments.
- \* *Jatropha costaricensis* Webster and Poveda — small tree or shrub, flowers white.
- \* *Jatropha curcas* L. — large leaves shaped like those of tulip popular, probably introduced.
- \* *Jatropha gossypiiifolia* L. — palmate lobed leaves, long hairs at nodes, purple flowers.
- \* *Julocroton argenteus* (L.) Didr. — silvery underside leaves, herb.
- \* *Mabea occidentalis* Benth. — raceme with mostly male flowers, copious white latex, shrub, dark green glabrous elongate oval leaves to 10 cm in length.
- *Manihot esculenta* Crantz — tapioca (introduced).
- \* *Manihot aesculifolia* HBK. (= *Manihot gualanensis* Blake) — wild one with very thin lobes on leaves, very wavy margin to leaves, yellowish white flowers with wide 2 cm long corolla tube.
- \* *Margaritaria nobilis* L. f. [= *Phyllanthus nobilis* (L. f.) M. Arg.] — shrub with 4-lobed pea-sized fruit, dry roundish with 4 stigma remnants at end, entire leaves; green fruit is glabrous.
- Phyllanthus acuminatus* Vahl. — acuminate 1 inch leaves.
- Phyllanthus amarus* Schum. and Thonn. — minute leaves, herb, leaves seem to be compound but are not.
- *Phyllanthus carolinensis* Walt — RCM.
- \* *Poinsettia heterophylla* (L.) K. and Gke. — large herb with yellow flowers, leaves strongly notched in lower half.

- \* □ *Ricinus communis* L. — herb to 2 m tall, castor bean, dry capsules with large smooth mottled seeds inside.
- \* *Sapium thelocarpum* Schm. and Pitt. — large tree with a pair of glands on petiole at base of leaf blade.
- \* *Sebastiania* aff. *confusa* Lundell (previously called *Stillingia* sp. and *Gymnanthes* sp.) tree with catkins of small yellow flowers with stinging hairs.  
*Tragia volubilis* L. — vine with stinging hairs.

## FABACEAE

- \* *Acosmium panamense* (Benth.) Yakoul. (= *Sweetia panamensis* Benh.) — tree with millions of tiny white flowers in September; fruit 1–3 seeded flat indehiscent dry 5–10 cm long pod with brick red seeds.
- \* *Aeschynomene americana* L. — tiny pinnules, non-sticktight fruits, fruits 1.5–3 cm long, 4 mm diameter single-seeded fruit segments, hairy herb plant, 5–7 seeds per fruit.
- \* *Aeschynomene ciliata* Vogl. — glabrous herb, yellow flowers, 1 cm long leaflets, 5–7 mm diameter fruit sections, fruits not sticktight, 1.5–3 cm long, 2–4 seeds per fruit.  
*Aeschynomene elegans* Schl. and Cham. — minute fruit, big rounded pinnules, fruit sections about 2–3 mm diameter.  
*Aeschynomene sensitiva* Sw.  
*Aeschynomene standleyi* A. Molina.
- \* *Andira inermis* (Wright) HBK. — medium-sized evergreen largely riparian tree with masses of purple flowers usually in alternate years; fruit borne on long stems outside of canopy, green when ripe and 2–5 cm long globular to oval, single marble-sized seed within; seeds heavily attacked by 3 species of *Cleogonus* weevils. Only *Andira* in Guanacaste.  
*Ateleia gummifera* (DC.) D. Dietr. — deciduous tree that seems to be identical to *A. herbert-smithii* except that *A. gummifera* lacks the lines of white colored lentils on the bark; one collection on record, from intersection of Río Higuierón with Pan American Highway (6 mi. S. of Cañas); wonder if this is not a synonym of *A. herbert-smithii*.
- \* *Ateleia herbert-smithii* Pittier — deciduous tree with many vertical branches in the crown; dioecious; flowers white, tiny; fruit nearly a circular glabrous beige samara, usually with one rust - red seed, fruit 2 cm long by 1–1.5 cm wide, in dense clusters at branch ends; apparently occurs in Costa Rica only in area of SRNP.  
*Calopogonium caeruleum* (Benth.) Hemsl. — fuzzy stems, flat pods, trifoliate, vine.
- \* *Calopogonium mucunoides* Desv. — hairy pod, 2 inches long, vine.
- *Calopogonium galactoides* (HBK.) Benth. — RCM.
- \* *Canavalia brasiliensis* Mart. ex Benth. — herbaceous vine with purple flowers, grows in inland forest edges, seeds dark beige and pods 15 cm long and light beige.

- \* *Canavalia maritima* (Aubl.) Thours. — herbaceous vine, the common ocean beach pea, purple flowers and 10–15 cm beige pods.
- o *Canavalia bicarinata* Standley — a rare vine in riparian sites in northern Puntarenas, will probably occur somewhere in Guanacaste; pod with a heavy ridge down the side and seeds mottled with black.
- \* *Centrosema plumieri* (Turp.) Benth. — herbaceous vine with dehiscent gray-brown somewhat flat pods 10–12 mm wide and 10–15 cm long; squarish flowers white with deep magenta keel, plant dries to very dark foliage.
- \* *Centrosema pubescens* Benth. (= *C. virginianum* auct. Guanacaste) — herbaceous vine with dehiscent gray brown flat pods 5–8 mm wide and 8–12 cm long; roundish purple-lavender flowers, plant dries to greenish foliage.
- \* *Centrosema sagittatum* (H. and B.) Brand ex Riley — herbaceous vine with single leaflet and alate petiole (arrowhead shaped leaf).
- o *Centrosema angustifolium* (HBK.) Benth. — RCM.
- Clitoria ternatea* L. — vine, calyx tubular, two bracts at base of calyx, leaves pinnate with 5 to 7 leaflets.
- \* *Cracca mollis* (HBK.) Benth. and Oerst. — 3–4 inch flat pod with segments for seeds, straight and about 3–4 mm wide, leaflets large herbaceous scandent.
- o *Cracca ochroleuca* (Jacq.) Benth. — inappropriately applied.
- \* *Crotalaria incana* L. — 3-foliolate, hirsute stems.
- \* *Crotalaria maypurensis* HBK. — pure yellow flowered herb to 2 m tall; large trifoliolate leaves; near houses SRNP (may be introduced).
- \* *Crotalaria pumila* Ortega. — tiny leaf and tiny pod herb to 75 cm tall, yellow seeds.
- \* *Crotalaria retusa* L. — herb to 1.5 m tall, flowers yellow with touches of red-purple; large simple leaflets, common in pastures; big pea pod; elongate, blunt-ended leaves.
- \* *Crotalaria sagittalis* L. — long narrow very hairy leaves, annual or perennial.
- Crotalaria tuerckheimii* Senn — annual with hairy leaves, long narrow but broader than *C. sagittalis*.
- \* *Crotalaria* 10722 — SRNP new species, like *C. incana* but not nearly so hairy.
- o *Crotalaria longirostrata* Hook. and Arn. — RCM.
- \* *Dalbergia glabra* (Millsp.) St. — rare woody vine to 5 m, white flowers in late dry season, pods 1–2" long, flat, indehiscent, beige, most abundant along Río Guapote and other plateau arroyos in SRNP.
- \* *Dalbergia retusa* Hemsl. (= *D. lineata* Pittier, *D. hypoleuca* Pittier) — medium-sized deciduous tree with masses of white flowers in the first half of the dry season, followed immediately by fully expanded flat green pods (indehiscent and black when ripe) about 2–3" long with 1–4 flat dark brown seeds, pods ripen a full year later.
- \* *Dalea carthagenensis* (Jacq.) Macbr. var. *barbata* (Oersted) Barneby [= *Parosela barbata* (Oersted) Rydb., = *Dalea humilis* (Rydb.) DC.] — herbaceous to 1 m tall woody shrub in pastures and forest edge, small leaflets with black dots on underside, very diffuse crown.
- o *Dalea cliffortiana* Willd. [= *Dalea annua* (Mill.) O. Ktze.] — RCM, leaves narrow and inflorescence more dense than in *Dalea carthagenensis*.

- *Dalea scandens* (Miller) Clausen var. *vulneraria* (Orsted) Barneby – very difficult to separate from *Dalea carthagenensis*, apparently reported from Guanacaste because of misidentifications.  
*Desmodium affine* Schlecht – medium leaflets, scandent small shrub, trailing, broad leaflets, white flower.
- Desmodium axillare* (Sw.) C. – long stipe, medium large fruit segments.
- \* *Desmodium barbatum* (L.) Benth. – very hairy upright shrub in pastures, hairy fruits in tight clusters at ends of stems.
- \* *Desmodium barclayi* Benth. – two seeded large fruits, large herbaceous vine, “double oatmeal”.
- \* *Desmodium canum* (J. F. Gmel.) Schirz and Thellung – violet flowers, upright herb, oval leaves.  
*Desmodium costaricensis* (Schinelli) Standl.
- \* *Desmodium glabrum* (Mill.) DC. – herb upright tall plant, single-seeded fruits when mature, “single oatmeal”.
- Desmodium procumbens* (Mill.) Hitchc. – delicate, tiny fruit, thin stems, elongate narrow leaves.
- \* *Desmodium sericophyllum* Schlecht. – shrub, blue and white flowers, large leaflets.  
*Desmodium scorpiurus* Desv. – fruit segments long and narrow.
- Desmodium tortuosum* (Sw.) DC. – upright herb, 5–8 seeds per fruit, similar leaf to “single oatmeal” but smaller.
- \* *Desmodium triflorum* (L.) DC. – trifoliate, rounded leaflets.
- *Desmodium infractum* DC. – RCM.
- *Desmodium intortum* (Mill.) Urban – incorrectly applied to *D. barclayi*.
- *Desmodium prehensile* Schlecht. – RCM.
- \* *Dioclea megacarpa* Rolfe – woody large vine with red resin when cut; flowers deep purple-blue on vertical spikes; stems hairy; fruit semi-dehiscent woody, 1–6 seeded; seed beige to brown 2–3 cm diameter almost spherical.
- \* *Diphysa robinoides* Benth. (= *D. humilis* = *D. carthagenensis* Jacq.) – scattered small tree; fruit inflated indehiscent 5–10 cm long wind-dispersed; flowers bright yellow.
- \* *Eriosema crinitum* (HBK.) G. Don – more elongate leaves, reddish hairs on underside.
- \* *Eriosema diffusum* (HBK.) G. Don – herbaceous shrub to 1 m tall with trifoliate leaves; yellow flowers and fruits borne in tight fuzzy clusters at the nodes; fruits 2-seeded; scattered in old pastures SRNP, silvery leaves.
- *Erythrina berteriana* Urbans – very rare tree with solid red seeds, may be introduced, not normally in deciduous forest of lowland Guanacaste, usually in fencerows.  
*Erythrina fusca* Lour. – swamp tree with spines, brown-gray cylindrical seeds.
- *Erythrina glauca* Willd.
- \* *Galactia striata* (Jacq.) Urban – herbaceous vine with flat pendant pods, slight S-shape.
- \* *Gilricidia sepium* (Jacq.) Walp. – deciduous small tree with lavender, yellow and white flowers; fruits dehiscent 1–2 cm wide, flat, 6–10 cm long.

- \* *Indigofera costaricensis* Benth. — herbaceous shrub with straight 1–5 seeded 1.5–2 cm rust brown cylindrical straight pods with a sharp point.  
*Indigofera hirsuta* L. — low bushy, red flowers, hairy pods point downward off of vertical leafless spikes.
- \* *Indigofera lespedezioides* HBK. — long thin leaflets; herb shrub to 2 m; long thin straight pods that point downwards, pods 2–3 cm long.  
*Indigofera jamaicensis* Spreng. (= *I. mucronata* Spreng.) — 2–4 pairs leaflets; thin pods 2–3 cm long.
- \* *Indigofera suffruticosa* Mill. — herbaceous shrub with salmon pink orange to purple flowers; pods partly dehiscent 2 cm long and curved like a banana; wide-spread along roads.
- \* *Indigofera suffruticosa* Mill. — herbaceous shrub with salmon pink orange to purple flowers; pods partly dehiscent 2 cm long and curved like a banana; wide-spread along roads.
- \* *Lonchocarpus acuminatus* (Schlecht.) Sousa — shrub to small deciduous tree; flowers blue in end of rainy season; seeds beige and distinctly sticky; pods glabrous, flat, beige almost round if 1 seeded, 1–5 seeds per pod, 2–3 cm wide pods; leaflets with long acuminate tip.
- \* *Lonchocarpus costaricensis* Pittier — deciduous forest tree with very large leaflets, especially on juveniles; indehiscent fruit dry flat 1–2-seeded beige to 4 cm wide and 10 cm long.
- \* *Lonchocarpus eriocarinalis* Micheli (= *L. phlebophyllus* Standl. and Steyerl.) — deciduous tree on high dry rocky hills; fruit densely dark brown velvet, strongly undulating surface, wind-dispersed, 3–6 cm long, 2 cm wide, indehiscent.
- \* *Lonchocarpus minimiflorus* Donn. Smith — deciduous small tree with minute reddish purple flowers in pointed spikes in mid-rainy season; indehiscent fruits 6–10 mm wide, with a heavy ridge along one straight side, 1–4 seeded, 3–6 cm long; leaflets obovate, pointed, with terminal leaflet usually much larger than laterals (has been misidentified as *Lonchocarpus nitidus* (Vog.) Benth., a South American species; very similar to Mexican *Lonchocarpus parviflorus* Benth.).
- \* *Lonchocarpus orotinus* Pitt. — deciduous small tree with small blue-red flowers in pointed spikes at beginning of rainy season; indehiscent fruits 10–15 mm wide, 1–6 seeded, 4–10 cm long; leaflets lanceolate to obovate, terminal leaflet not much larger than laterals (very similar to *L. minimiflorus* but easily distinguished in field in SRNP by leaflet and fruit shape).  
*Lonchocarpus phaseolifolius* Benth. — trifoliolate tree, deciduous.
- \* *Lonchocarpus rugosus* Benth. — deciduous tree among oak forest in SRNP area, big bunches of 10–20 mm wide 4–10 cm long finely tomentose fruits in rainy season (the type of *L. rugosus* is from eastern Mexico and differs from the Pacific coast *L. rugosus* in seedling morphology; eventually it will be given a different specific or subspecific name — M. Sousa, personal communication).
- o *Lonchocarpus guatemalensis* Benth. — is a misidentification.
- \* *Machaerium arboreum* (Jacq.) Vogl. — rare shrubby vine in riparian vegetation SRNP; fruits 4–6 cm long, glabrous, single-seeded.

- \* *Machaerium biovulatum* Micheli — deciduous rare tree with masses of lavender-white flowers in late rainy season; fruits single-seeded samaras 3–5 cm long, somewhat hairy.
- \* *Machaerium kegelii* Meisner — rare woody huge vine in riparian vegetation; fruits hairy about 3 cm long, single-seeded samara; stems have enormous recurved hooks and are densely hairy.
- *Machaerium lunatum* — is probably a synonym or misidentification for *M. arboreum*.
- \* *Mucuna pruriens* (L.) DC. — herbaceous vine with purple flowers in a pendant cluster; fruits brown and dehiscent covered with violently urticating hairs.
- *Mucuna andreana* Micheli — occurs in riparian vegetation in northern Puntarenas and probably above 500 m elevation in Guanacaste; white flowers on long pendant inflorescences, bat pollinated; seeds black, disks, pods dehiscent thin woody, finely tomentose.
- \* *Myrospermum frutescens* Jacq. — small deciduous tree with white flowers; samara attached by the tip of the wing; leaflets with pelucid lines in them.
- *Pachyrrhizus erosus* (L.) Urban — trilobed, trifoliate leaf vine.
- *Pachyrrhizus vernalis* Claussen — a northern species or name, is a synonym of *P. erosus* or a sibling species.
- *Phaseolus anisotrichus* Scheele — herbaceous vine, pods like small hairy editions of *P. lunatus*.
- \* *Phaseolus atropurpureus* DC. — leaflets tend to be slightly lobed and gray pubescent beneath.
- *Phaseolus gracilis* Poepp.
- \* *Phaseolus linearis* HBK. — very narrow 2 inch long leaves, herbaceous vine.
- \* *Phaseolus lunatus* L. — wild lima bean, vine, half-moon bieve sharp pointed pods.
- \* *Phaseolus spectabilis* Standl. — seems to intergrade with *P. linearis* and *P. adenanthus*.
- *Phaseolus adenanthus* Meyer.
- \* *Piscidia carthagenensis* Jacq. [= *P. communis* (Blake) I. M. Johnston] — deciduous tree with four-winged 1–4 seeded indehiscent fruits that break into sections, leaflets with appressed hairs beneath.
- \* *Platymiscium pleiostachyum* Donn. Sm. — rare deciduous tree with opposite compound leaves; 1 on the Río Guapote, a few others in COMELCO; fruits 4–6 cm long, flat, dry, indehiscent with one seed.
- *Platymiscium dimorphandrum* Donn. Sm. — no record from Guanacaste; glabrous peduncle.
- \* *Pterocarpus rohrii* Vahl. (= *P. hayesii* Hemsl.) — occasional large deciduous tree with red resin from cut bark; wind-dispersed fruits 3–5 cm in diameter, usually 1 seeded (rarely 2); used to be common above waterfall on COMELCO property, rare in SRNP (but note fruits and seeds larger there).
- *Pterocarpus officinalis* Jacq. — no collection records from Guanacaste, an old misidentification.
- \* *Rhynchosia calycosa* Hemsl. — large flowers and fruit, long sepals.
- *Rhynchosia edulis* Griesb. — glandular pubescence (one collection, 12 miles south of La Paz, Spellman *et al* 511; another PAO 193, COMELCO).

- \* *Rhynchosia minima* (L.) DC. — small flowers and the smallest fruit, shortest sepals (like those of *R. edulis*).
- \* *Rhynchosia reticulata* (Sw.) DC. — large flowers and fruit, short sepals.
- o *Rhynchosia ixodes* Standl. — RCM.
- \* *Sesbania emerus* (Aubl.) Urban — annual herb to 3 m tall; fruits 15–20 cm long dehiscent beige 2–3 mm diameter; flowers yellow.
- o *Sesbania exasperata* — this is a misidentification.
- \* *Stylosanthes guyanensis* (Aubl.) Swartz — 2–3 cm leaflets, shrubby herb.
- \* *Stylosanthes humilis* HBK. — shrubby herb.  
*Stylosanthes subsericea* Blake.
- Stylosanthes fiscosa* Sw. — herb-like shrub with smallest leaflets.
- \* *Tephrosia multifolia* Rose (= *T. heydeana*) — 1–2 m herb with dark tops to leaves, angular stem, pinnately compound leaf.
- \* *Tephrosia tenella* A. Gray — low herb with narrow leaves, sharp angle to secondary venation.
- \* *Teramnus uncinatus* (L.) Sw. — herbaceous vine, hairy long pod, yellow seeds.  
*Vatairea lundellii* (Standl.) Killip — large deciduous tall tree with smooth bark and tall well-developed buttresses; fruit a single seeded indehiscent samara attached at the seed end, with longitudinal ridges about 8–10 cm long, fruit falls in April; rare riparian forest tree (seen only along Río Higuierón, M.A.G. station, Finca Taboga).
- Vigna vexillata* (L.) A. Rich. — herbaceous vine with hairy leaves and stem, white flowers.
- \* *Willardia schiedeana* (Schlecht.) Hermann. — large deciduous tree with bright blue flowers, small multi-seeded wind-dispersed flat fruits.  
*Zornia* sp. — herb.

## FAGACEAE

- \* *Quercus oleoides* Cham. and Schlecht. — evergreen tree in uplands of lowland northern Guanacaste, only oak in lowland Guanacaste; normal appearing acorns displaying self-burying behavior through tuber formation by new seedlings.

## FERNS

### Fern Allies and Ferns

*Lycopodium cernuum* L. Plants terrestrial, stems prostrate or erect, with several plumose aerial branches these with lateral divisions giving a tree-like appearance to the plants. Strobiles numerous, pointing downward. Leaves of main stems spirally arranged in 16–24 ranks. Grows on exposed banks.

*Lycopodium clavatum* L. Plants terrestrial with creeping stoloniferous stems. Leaves of main stems denticulate and with apical awns, those of branches with

entire margins. Strobiles few, long. Grows on banks of upper limits of the area discussed in this checklist.

*Lycopodium reflexum* Lam. Plants terrestrial, erect or ascending from a procumbent base, stiff, 1–3 times dichotomous. Leaves crowded, ascending or more commonly reflexed, in spirals of 12–16 ranks, denticulate or ciliate. No strobiles but sporangia scattered towards apex. On wet banks near upper limits of the area of this florule.

*Selaginella cladorhizans* A. Br. — Plants small (10–15 cm) prostrate. Branches often flagelliform. Lateral leaves without false nerves. On wet rocks or shady banks.

\* *Selaginella cuspidata* Link — Rosette forming and curling inwards when dried. Median leaves with long cilia and narrow clear-callused margins. Common on forest floors and banks. Confused with *S. pallescens*.

*Selaginella estrellensis* Hieron. — Stems suberect with rhizophores in lower half only. Lateral leaves obliquely oblong, subacute, shiny and cordate at the base. Median leaves aristate, usually ciliate. Rare, confined to upper limits of our area.

\* *Selaginella horizontalis* (Presl) Spring — Stems articulate, branched from the base, usually prostrate. Lateral leaves membranose, ovate-lanceolate with large long-ciliate auricles. Median leaves with long but not ciliate auricles and a short arista. In forests, often caespitose.

\* *Selaginella pallescens* (Presl) Spring — Rosette forming and curling inwards when dry. Median leaves shortly denticulate, not ciliate, not to be confused with *S. cuspidata*. On banks, forests, on rocks. Common.

*Selaginella silvestris* Aspl. — Stems articulate, branched from the base with roots in lower 2/3rds. Branches ascending. Lateral leaves membranose, oblong. Median leaves with 2 short unequal auricles. Rare, in shaded forests above 100 m elevation.

*Selaginella umbrosa* Lemaire ex Hieron. — Stems bright red at the base, erect. Leaves membranose, uniform in main stem. Lateral leaves with cilia only at the base. Rare, near upper limits of our area.

*Equisetum bogotense* HBK. — Small horsetail. Freely branching at nodes of lower portions of stems. Fertile branches with only one terminal strobile. Rare in Guanacaste, its grows on wet clay banks and along exposed rocky margins of rivers.



*Acrostichum aureum* L. — The common leather or marsh fern. Plants large. The fronds simply pinnate, pinnae leathery, only the upper ones fertile and somewhat contracted. Sori covering the entire under surface.

\* *Adiantum concinnum* Willd. — Pendent Maidenhair. Plants terrestrial, rarely epiphytic. Fronds 3-pinnatifid. Rachis zigzagging, long internodes. Lower basal pinnules overlapping rachis. Common along river banks.

\* *Adiantum deflectens* Mart. — Plants usually small, fragile, simply pinnate. Pinnae on slender petioles, suborbicular, crenate. Apex of frond rooting. Common on rocks under shade.



- Adiantum feei* Moore ex Fee — Like *concinnum* in general habit but internodes shorter, rachis and petiole not shiny but covered with short hairs. Rare.
- \* *Adiantum latifolium* Lam. — Fronds at least 2-pinnate. Basal pinnae evenly 1-pinnate. Sporangia in many separate, adjacent sori. Pinnules glaucous beneath.
- \* *Adiantum obliquum* Willd. — Fronds only 1-pinnate. Pinnae dark green on both sides, the sterile ones deeply and unevenly biserrate.
- Adiantum petiolatum* Desv. — Like *obliquum* but pinnae are glaucous beneath. The sterile ones evenly serrate-denticulate.
- Adiantum tetraphyllum* H. B. ex Willd. in L. — Like *latifolium* but pinnules are dark green on both sides and the costa (rachis of pinnae) is angled. The pinnules are decurrent into a winglike flange.
- \* *Anemia hirsuta* (L.) Sw. — Plants small, simply pinnate. Pinnae inaequilateral, lacinate. Sporangia borne in spicate clusters on dimorphic pinnae. Veins free.
- \* *Anemia oblongifolia* (Cav.) Sw. — Plants forming rosettes. Fronds 1-pinnate, pinnae subreniform or arcuate, rounded apex. Veins free.
- Anemia pastinacaria* Moritz — Like *hirsuta* but pinnae with 1–2 basal upper lobes. Veins free.
- Anemia phillitidis* (L.) Sw. — Plants usually large, erect, 1-pinnate. Pinnae entire, usually acute at the apex, rounded at the base. Veins reticulate.
- \* *Asplenium auritum* Sw. — Plants epiphytic, rarely rupicolous. Fronds 1-pinnate, pinnae shortly petiolate or sessile, entire, narrow and acuminate or rarely with a lobed upper base. Sori several facing apex of pinna. A species complex in need of study.
- \* *Asplenium formosum* Willd. in L. — Plants terrestrial or epipetric, 1-pinnate, pinnae serrate, sori 1–3 on basiscopic portion of pinnae. Plants small and fragile.
- Asplenium praemorsum* Swartz — Plants epiphytic or epipetric, 1-pinnate. Pinnae trapezoidal in outline, with copious and close parallel veins. Very resistant to drying, it is one of the resurrection ferns.
- \* *Asplenium pumilum* Sw. — Terrestrial or epipetric. Plants small, fronds deltoid in outline and subtripartite in plan, pinnatisect.
- \* *Athyrium skinneri* (Baker) Diels — Plants terrestrial. Rootstalk suberect. Petiole fleshy and fragile. Frond deltoid in outline, 3–4-pinnatisect. Sori discreet on both sides of the fertile veins. Indusium curved to form a letter J or U.
- \* *Azolla mexicana* Schlecht. & Cham. — Mosquito ferns. Minute floating ferns with imbricate leaves. Resembles duckweed. Ditches and stagnant or slow flowing waters.

#### KEY

- \*: Known to grow in Santa Rosa National Park.
- RCM: Names used as a very probable misidentification of a plant collected at Santa Rosa National Park by Ross Callaway; these names usually apply to plants in Mexico or northern Central America, or from wetter sites in Costa Rica.
- : Questionable determination, name use, geographic origin, etc.
- : Cultivated or ornamental in Guanacaste.

- Blechnum fraxineum* Willd. in L. — Terrestrial. Fronds dimorphic. Sterile ones short, often forming a rosette, with numerous proximate entire pinnae. Fertile ones erect, much taller, with fewer distant pinnae. Sori contiguous to midvein.
- \* *Blechnum occidentale* L. — Terrestrial. Not dimorphic. Fronds 1-pinnate, pinnae cordate at the base. Sori on both sides of midvein. Common.
- Blechnum polypodioides* Raddi — Terrestrial. Lamina pinnatifid, dwindling at the base. Segments all adnate. Sori often only on one side of midvein.
- Bolbitis pergamentacea* (Maxon) Ching in C. Chr. — Fronds dimorphic. The sterile one entire, the fertile one long petiolate, much taller, entire or trilobed. On wet rocks and banks in the upper limits of Guanacaste.
- Bolbitis portoricensis* (Spreng.) Hennip. Fronds dimorphic. Sterile ones pinnate-pinnatisect, rooting at the tip of the flagelliform apex. Fertile ones erect, pinnatisect.
- \* *Campyloneuron angustifolium* Fee — Epiphytes. Fronds fasciculate, entire, narrowly lanceolate, acuminate. Midvein prominent. Secondary veins parallel to enclose tertiary veins with an excurrent veinlet. Leaves roll when dry.
- Campyloneuron phyllitidis* Presl — With the venation characters of *angustifolium* but fronds are wide (3—more cm), sori are in several rows and the leaves never roll when dry.
- Ceratopteris pteridoides* (HK.) Hieron. — Lettuce ferns, aquarium ferns. Plants rooted or floating. Fronds dimorphic. The sterile ones 3—4-pinnatisect. The fertile ones very narrow, fleshy, with furrows at the margin to protect the sporangia. Often the stems of floating plants are inflated.
- Cnemidaria choricarpa* (Maxon) Tryon — Trunkless tree-fern. Stipes with bicolorous scales at the base, often with a few prickles. Fronds 1-pinnate, pinnae shallowly lobed. Veins free except near the costa where they form one row of areoles. Sori in line close to margin, subtended by a cup-like indusium. Rare in Guanacaste where it is found only at higher elevations and wet environments.
- Ctenitis ampla* (HBK. ex Willd.) Ching — Large terrestrial ferns. Fronds 3—4-pinnatifid, at least at the basal pinnae. Scales at base of stipe are narrow, filiform, clathrate, with denticulate margins. Rare. Seen on wet banks of some rivers.
- \* *Cyathea costaricensis* (Kuhn) Domin — Medium size to tall, slender, tree fern. Fronds gracile, 3-pinnatifid. Crown of trunk and base of stipes clothed with long, lanceolate, pale tan membranose scales. Rare.
- \* *Cyclopetalis semicordata* (Sw.) J. Sm. — Terrestrial or more commonly epipetric ferns, medium size. Fronds 1-pinnate. Pinnae with one truncate upper base and another rounded lower base overlapping the rachis. Sori many and scattered on dorsal surface but always on a fertile vein.
- Dennstaedtia dissecta* (Sw.) Moore — Large terrestrial ferns. Fronds 2—3 m long, 3—4-pinnate. Sori in cup-shape marginal indusia. Rhizome glabrous or sparsely hairy, never with scales.
- Dicranopteris pectinata* (Willd.) Und. — Terrestrial ferns of indeterminate growth. Rachis somewhat flexuose, pinnae pectinate, glaucous underneath. Sori medial on the segments, made up of 4—6 sporangia with oblique annulus.
- Diplazium subsylvaticum* Christ in Pitt. — Terrestrial ferns of medium size. Fronds 1-pinnate with a pinnatisect apex. Veins free, many-branched. Sori of

both sides of the fertile veins (at least in the basal area of pinnae) covered by a double, striaght indusium. Rare.

- \* *Dryopteris karwinskyana* (Mett.) Kunze – Terrestrial, small to medium size ferns often growing on exposed banks, rocky areas and lava. Fronds 2-pinnatifid. Sori round, large, covered by an inflated pale grey indusium. Rare.
- Hymenophyllum polvanthos* (Sw.) Sw. – Filmy fern. Small epipetric or epiphytic fern with long creeping thread-like rhizome. Fronds one cell thick, traslucent, 2–3-pinnatisect. Sori terminal on fertile segments, protected by rounded bivalved indusia. Rare. Seen only in very protected conditions along riparian forest. Other filmies may turn up in similar conditions.
- Hypolepis repens* Presl – Large terrestrial fern resembling a finely dissected bracken. Sori at the sinuses between segments, protected by a lacinate indusium opening and free towards the margin. Rachises and stipes with prickles of spines. Rare. Higher elevations.
- Lindsaea stricta* (Sw.) Dryander – Terrestrial ferns often growing in open pastures and well drained banks. Fronds erect, rigid, leathery, 1-pinnate. Pinnae dimidiate, small, with sori in a continuous line just below the upper margin, protected by a continuous indusium. Veins free.
- \* *Lygodium venustum* Swartz – Climbing fern. Plants usually very large festooning the forest trees and posts. Stem wiry, brittle, at the nodes with long petiolated pairs of compound pinnae. Pinnae 5-lobed, almost palmate. Sori in spike-like marginal structures. Fertile pinnae different in general shape and size from sterile ones. Veins free. *Lygodium heterodoxum* kunze has been collected once in the area of Barranca, it has reticulate venation.
- \* *Marsilea deflexa* A. Braun – Water clover, four-leaved water clover. A seasonal aquatic fern usually found on innundated vertisols. Rhizome creeping and tangling. Fronds erect, long petiolate, 4-segmented. Segments cuneate at the base, rounded at apex. Sporangia capsule-like, stalked, 3–4 at base of petioles.
- Nephelea mexicana* (Schlecht. & Cham.) Tryon – In the area of this flora it is the only tree fern with shiny, long, curved spines. Along river banks in the upper regions of Guanacaste. Rare.
- Nephrolepis biserrata* (Sw.) Schott – Sword fern, Wild Boston fern. Epiphyte, rarely terrestrial. Fronds 1-pinnate. Veins free. Sori near margin protected by an indusium which opens outwardly, reniform to subrotund. Fronds can reach several meters in length. Often seen on trunks of palms.
- \* *Nephrolepis rivularis* (Vahl) C. Chr. – Like *biserrata* but never very large, pinnae are of unequal bases, the lower cuneate, the upper acutely auriculate. Pinnae minutely squamulose beneath. Same habitat as preceding species.
- Notholaena affinis* (Mett.) Moore – Small epipetric or terrestrial ferns. Fronds pinnate-pinnatifid, narrowed at both ends. Pinnae with dense ceraceous white indument beneath. Stipes fragile and shiny, black. Usually found on degraded serpentinic sea shore cliffs.
- \* *Notholanea brachypus* (Kunze) J. Sm. – Terrestrial or epipetric. Plants are rosette forming, the leaves curling when dried. Fronds 4–30 cm long, 1-pinnate-pinnatifid. Pinnae densely covered with a rusty, lanate tomentum beneath. Common.

- \* *Pellaea skinneri* Hooker — Small ferns growing on soil or rocks, often exposed to sea spray. Fronds subternate in plan, segments deltoid. Sori marginal, continuous, protected by a marginal flap.  
*Phlebodium aureum* (L.) J. Sm. — The Golden Polypody. Epiphytes of medium or large size. Rhizome thick, densely covered by reddish-brown scales. Fronds pinnate-pinnatisect, with one (rarely two) rows of large discrete sori. Some fronds are covered by whitish cuticular exudates. Stipes articulate to rhizome, veins forming several areoles, the sori fed by two jointed excurrent veinlets.
- \* *Pityrogramma calomelanos* (L.) Link — Silver back ferns. Common terrestrials growing on banks and rivers beds. Fronds pinnate-pinnatisect to 3-pinnate. Pinnae with white ceraceous indument beneath. Stipes shiny, black.  
*Pityrogramma dealbata* — Like preceding species but segments are roundish or obtuse. Stipes shiny reddish-brown.
- \* *Pleopeltis astrolepis* Fournier — Epiphyte. Rhizome long creeping, clothed with small, adpressed, peltate scales. Fronds usually less than 10 cm long and 1 cm wide, lanceolate, entire, leathery. Sori roundish, discreet. The blades with scales similar to those of rhizome.  
*Polypodium furfuraceum* Schlecht. & Cham. — Small epiphytic polypody. Rhizome short creeping, densely scaly. Fronds pinnatisect, erect, rigid, covered with numerous peltate, white to pale silvery gray scales with a dark reddish-brown center. Sori discreet, often concealed by the scales.
- \* *Polypodium kuhnii* Fournier — Rarely terrestrial, more commonly epipetric or epiphytic on palm trunks. Large polypody. Rhizome massive, fleshy, with a few deciduous scales. Stipes articulate. Fronds pinnate-pinnatisect. Veins forming at least one row of simple areoles near the costa, then free and branched. Rare.  
*Polypodium lindenianum* Kunze — In the flora area, the only polypody with 3-pinnatifid fronds. Epiphyte. Rare.  
*Pteris quadriaurita* Retz. — Terrestrial ferns of small to medium size. Fronds 1-pinnate above the base. Basal pinnae with elongated 1(2) basal pinnules. Veins always free. Sori marginal, interrupted at the sinuses, protected by the indusium which is the reflexed, modified margin.  
*Salpichlaena volubilis* (Kaulf.) J. Sm. — Climber of indeterminate growth. Pinnae 5–7-segmented. Sori costal protected by a rolled membranose indusium, both detaching together. Rare. Seen once in the Tropical Moist of the Barranca area.  
*Tectaria incisa* Gavanilles — Terrestrial ferns of rivers banks and shaded slopes. Fronds 1-pinnate above the base. Basal pinnae with 1–2 basiscopic lobes. Venation complex, much reticulate, included veinlets many. Sori scattered on dorsal surface, indusiate. Several forms are present in the area.
- \* *Tectaria mexicana* (Fee) Morton — Terrestrial ferns of medium size. Fronds 2–3-pinnatifid. Venation complex, anastomosed. Free included veinlets rare or absent. Rhizome scales concolorous.
- \* *Thelypteris* Schmid. — A large genus of ferns the species of which are in need of revision. Several subgenera are recognized, and some smaller genera segregated from it, by the venation patterns. The number of species of *Thelypteris et al.* in Guanacaste is unknown and collections (complete specimens with fertile fronds and rootstalk) are requested.

*Trichomanes capillaceum* L. Filmy fern of skeletonized architecture. Rhizome creeping. Fronds small (rarely more than 7 cm tall) 3-pinnatisect, thread-like. Sori protected by conical involucre. In protected conditions such as wet, rocky crevices, tree-fern trunks. Very rare.

*Trichomanes radicans* L. Filmy fern of large size, the fronds reaching up to 30 cm in length and about 10 cm wide. Much divided, the blades are fully developed in their laminar tissues, 2–3-pinnatifid. Sori in conical involucre opening by flared flanges. On wet rocks at elevations above 200 m.

*Trichopteris stipularis* (Christ) Tryon – Tree fern. Trunk some 3 m tall. Crown and base of stipes with brown or blackish scales. Base of stipes muricate. The only tree fern in the area in which the lower basal pinnules of the pinnae overlap the rachis to form an X. Rare. A colony of some 12 individuals has been seen along the upper course of Río Ahogados.

- \* *Vittaria lineata* (L.) J. Sm. – The shoestring fern. Epiphytes of narrow, linear fronds. Roots forming a dense mat. Sori marginal, in furrows.

## FLACOURTIACEAE

*Casearia aculeata* Jacq. (= *Casearia guianensis* auct Guanacaste) – round green pea-size fruits that show red-orange when they open up, broader leaves.

- \* *Casearia arguta* HBK. – large leaves with clusters of white flowers in axils.

*Casearia commersoniana* Camb. – huge leaves, more teeth on leaves.

- \* *Casearia corymbosa* HBK. (= *Casearia nitida* of old) – orange fruits that open to expose a red aril, narrower leaves.

*Casearia praecox* Griseb. – shrub, small leaves, large woody base where peduncles attach.

- \* *Casearia sylvestris* Sw. – very small leaves, shrub, leaves asymmetrical.

- \* *Casearia tremula* (Grisebach) Wright (= *Synandrina riparia* Standl. and L. Wms.) – single large red fruits, more rounded leaves, medium-sized tree.

- o *Casearia arborea* (Rich) Urban – misidentification.

*Laetia thamnia* L. – shrub with large round single brown fruits – PAO 1744 one collection.

- \* *Prockia crucis* L. – shrub with 3 large conspicuous sepal lobes, yellow flowers.

*Xylosoma anisophylla* Standl. – single large spine at node, leaf comes from base of spine, shrub, round leaves.

*Xylosoma flexuosum* (HBK.) Hemsl. – spiny shrub, elongate leaves, spines thin.

- \* *Zuelania guidonia* (Sw.) Britton & Millsp. – tree with 5 cm diameter spherical 3-valved fruit.

## GENTIANACEAE

*Nymphoides indica* (L.) O. Kuntze – aquatic with floating leaves.

*Schultesia guianensis* (Aubl.) Malme – herb, purple flowers, shorter plant with few, large flowers and fruit.

*Schultesia lisianthoides* (Griseb.) Benth. and Hook. — herb. with lavender flowers tends to be taller plant, more smaller flowers and fruits.

#### GESNERIACEAE

- \* *Achimenes longiflora* DC. — rhizomatous upright herb, blue flowers, often growing on rocks in moist creek beds.
- Koellikeria erinoides* (DC.) Mansf. [= *Koellikeria argyrostigma* (Hook.)] — rhizomatous rosette herb, leaves with silvery spots, flowers small on a short raceme, corollas white or pink and red.
- Kohleria tubiflora* (Cav.) Hanst. — rhizomatous herb or small shrub with red flowers with yellow green tip, grows near streams or in damp areas.
- o *Kohleria spicata* (Kunth) Oerst. — probably occurs but not collected, corollas red with a broader reddish limb, on damp exposed banks.

#### GUTTIFERAE

*Calophyllum calaba* Jacq. — tree.

*Clusia rosea* Jacq. — epiphytic tree on cliffs and trees in wet areas.

*Rheedia acuminata* (R. and P.) Pl. and Tr. — tree.

- \* *Rheedia edulis* Triana and Planch. — lanceolate opposite leaves with dark brown petioles, small tree with white flowers.
- \* *Vismia baccifera* (L.) Tr. & Pl. — small tree-shrub with new leaves clasped tightly together over shoot tip.

#### HAEMODORACEAE

*Xiphidium caeruleum* Aubl. — lily-like with large spike of red fruits.

#### HELICONIACEAE

*Heliconia latispatha* Benth. — herb with large orange-yellow inflorescence, banana-like leaves.

#### HERNANDIACEAE

*Gyrocarpus americanus* Jacq. — big riparian tree with deeply corrugated bark that comes off in elongate corky ridges; brown dry 2 cm diameter indehiscent fruits with two 10 cm wings.

## HIPPOCRATEACEAE

- \* *Hemiangium excelsum* (HBK.) A. C. Smith [*Hippocratea excelsum* (HBK.) A. C. Smith] — shrub to small tree with tri-lobed woody fruit that open to drop samaras out.  
*Hippocratea volubilis* L. — woody vine with 3-part fruits with winged seeds inside.
- \* *Hylенаеа praecelsa* (Miers) A. G. Smith — woody vine.

## HYDROPHYLLACEAE

- \* *Hydrolea spinosa* L. — spiny herb in swamp, blue flowers in furry heads.

## IRIDACEAE

- Cipura paludosa* Aubl. — white flower herb, small.  
*Nemastylis* Davidse *et al* 809 — blue flowered herb.  
*Nemastylis* Heithaus 198 — unknown herb.

## LABIATAE

- Hyptis brachiata* Briq. — roundish sessile leaves to 1.5 inches long, flowers in roundish paired heads at each node.
- \* *Hyptis capitata* Jacq. — inflorescence in large balls at ends of stems, large leaves.  
*Hyptis mociniana* Benth. — highly expanded inflorescences at ends of paired lateral branches.  
*Hyptis mutabilis* (Rich.) Briq. — highly expanded inflorescences at ends of main leafy branches.
  - \* *Hyptis pectinata* Poit. — flowers yellowish white, lots of upright catkin-like inflorescences at end of stalk.
  - \* *Hyptis suaveolens* (L.) Poit. — very coarse, blue-flowered, densely mixed leaves and inflorescences.
  - \* *Hyptis verticillata* Jacq. — most expanded inflorescences of all.
  - *Hyptis savannarum* Briq. — RCM.
  - *Hyptis vilis* Kunth and Bouche — RCM.
  - \* *Marsypianthes chamaedrys* (Vahl.) L. Ktze. — opposite leaves, herb, heavy tooth margins of small leaves, inflorescence a hairy axillary cluster.  
*Ocimum basilicum* L. — small flowers, blue-flowered herb.  
*Ocimum micranthum* Willd. — large flowers, blue flowered herb.  
*Salvia hyptoides* Mart. and Gal. — small ball inflorescences at ends of branches, herb.
  - \* *Salvia occidentalis* Sw. — very small flowers and leaves, blue flowers, herb.

## LAURACEAE

- Nectandra globosa* (Aublet) Mez – large leaves, fruit like an *Ocotea* fruit, tree.  
*Nectandra laurel* Klotzsch & Karsten – west of Nicoya.  
\* *Ocotea veraguensis* (Meisn.) Mez – tree with red fruit bases and black detachable fruit, white flowers, wavy edges to shiny leaves.  
□ *Persea americana* Mill. – cultivated tree.

## LEGUMINOSAE (see CAESALPINACEAE, FABACEAE, MIMOSACEAE)

## LEMNACEAE

*Lemna* sp. – floating on pond water.

## LILIACEAE

- \* *Smilax spinosa* Mill. – spiny herbaceous vine; leaves curved parallel veined; pair of tendrils on petioles, sometimes.  
\* *Athenium* sp.

## LOASACEAE

- Gronovia scandens* L. – vine that looks like a curcubit but it has no tendrils, cream flowers, herbaceous vine.  
\* *Mentzelia aspera* L. – upright herb with stinging hairs, probably RCM.

## LOBELIACEAE

- Hippobroma longiflora* (L.) G. Don [= *Isotoma longiflora* (L.) Presl] – herbaceous, white tubular flower, heavily toothed leaf.  
*Lobelia splendens* Willd. – red flowers tubular, herbaceous.  
\* *Lobelia xalapensis* HBK. – flowers bluish-white.  
*Sphenoclea zeylanica* Gaertn. – spikes of sessile flowers (often mistaken for *Phytolacca*).

## LOGANIACEAE

- Buddleia americana* L. – shrub or small tree.  
*Cynoctonum mitreola* (L.) Britt. – herb with upright two-horned small fruit.  
\* *Polypremum procumbens* L. – small herb with axillary flowers.  
*Spigelia anthelmia* L. – large leaves, long infrutescences, spines on fruit bases.  
*Spigelia* nsp.? Opler 924.



- *Spigelia humboldtiana* Cham. and Schlecht. — RCM.
- *Spigelia polystachya* Kotsch. — misidentification.

## LORANTHACEAE

- \* *Phoradendron robustissimum* Eich. — oval to wide leaves.
- \* *Phoradendron quadrangulare* (HBK.) Krug & Urb. — narrow strap-shaped leaves, small yellow fruits.
- \* *Psittacanthus calyculatus* (DC.) G. Don — big red flowers, very brittle large leaves, black large fruits.
- \* *Struthanthus oerstedii* (Liv.) Standl. and Cald. — small round to oval leaves, clusters of fruits and leaves mixed together.

## LYTHRACEAE

*Ammannia auriculata* Willd. — herb with elongate strap-like opposite small leaves, axillary flowers, pedunculate, base of leaf wraps around stem.

*Cuphea carthagenensis* (Jacq.) MacBr. — nearly sessile peduncles, broad small leaves, herb.

*Cuphea utriculosa* Koehne — flower on 1 cm peduncle, narrow leaves, herb.

*Rotala ramosior* (L.) Koehne [= *Rotala dentifera* (Gray) Koehne] — leaf base does not wrap around the stem.

## MALPIGHIACEAE

- \* *Banisteriopsis cornifolia* (HBK.) Robins ex Small — leaves lauraceous, flowers yellow, leaves appressed pubescent below.
- \* *Banisteriopsis muricata* (Cav.) Cuatr. [= *Banisteria argentea* (HBK.) Spreng] — leaves sericeous (silvery) below, flowers purple.
- \* *Bunchosia biocellata* Schlecht. — medium-sized tree with yellow flowers; fruits orange juicy 1–2 cm diameter spheres with a single large soft spherical seed; trunk twisted-fluted (previously misidentified as *Bunchosia cornifolia* HBK.).
- \* *Byrsonima crassifolia* (L.) HBK. — bushy tree, in openings and severely deciduous forest; fruits yellow 1.5–2.5 cm diameter juicy spheres with a large single pit; flowers orange and pink.
- \* *Gaudichaudia albida* C. & S. — vine, winged fruits (2 unequal-sized wings per fruit).
- \* *heteropteris beecheyana* Adr. Juss. — reddish brown undersides to leaves, heavy woody vine, thickening of the wing of the samara is on the side away from the stigma, 1–3 samaras in cluster.
- \* *Heteropteris laurifolia* (L.) Adr. Juss.
- \* *Hiraea reclinata* Jacq. [= *Hiraea obovata* (HBK.) Ndzu.] — flowers on long peduncle from one place, vine; leaves look like spear-points.
- \* *Malpighia glabra* L. — shrubby small tree with pink flowers on long peduncle.

- Malpighia emarginata* DC. — shrub with coriaceous leaves, obovate; (this has been misidentified as *Malpighia tomentosa* Sesse and Moc.).
- \* *Stigmaphyllon ellipticum* (HBK.) Adr. Juss. — small elliptical leaves to point, woody with yellow flowers, 1–3 samara fruit, saw teeth along the side of the seed swelling, thickening of the samara wing is on the side toward the stigma.
  - Stigmaphyllon humboldtiana* (HBK.) Juss. [= *Stigmaphyllon tillifolium* (HBK.) Nied.] — vine.
  - o *Stigmaphyllon lindenianum* Adr. Juss. — probably an incorrect determination.
  - Tetrapteris macrocarpa* Johnston — liana.

## MALVACEAE

### *Abutilon brenesii* Standl.

- o *Abutilon umbellatum* (L.) Sweet — RCM.
- o *Anoda cristata* (L.) Schlecht — RCM.
- \* *Briquetia spicatum* (HBK.) Fryxell [= *Pseudabutilon spicatum* (HBK.) Fries] — herb to 1 m tall, large leaf, cordate base around petiole, clusters of fruits at nodes up a central spike.
- \* *Herissantia crispa* (L.) Briz. [= *Abutilon crispum* (L.) Medic.] — herbaceous vinoid with silvery paper lantern fruits 1–2 cm in diameter.
- \* *Hibiscus brasiliensis* L. — shrub with bright red-pink small flowers and small leaves.
- o *Hibiscus rosa-sinensis* L. — large red-flowered ornamental shrub.
- \* *Hibiscus tiliaceus* L. — upper beach shrub or small tree with large yellow flowers.
- Kosteletzkya pentasperma* (Bert) Griseb. — herb with very hairy stem, single 5-flanged fruits on 1–2 cm peduncle, medium-sized leaves.
- \* *Malachra alceifolia* Jacq. — very hairy and spiny with lots of large holes eaten in leaves, thick stem herb, massive inflorescences, corolla yellow, stem hairs to 1 mm long.
- \* *Malachra fasciata* Jacq. — corolla white, stem hairs 2–3 mm long, similar to *M. alceifolia*.
- Malachra radiata* L. — palmately linear-lobed leaves, herb.
- \* *Malvaviscus arboreus* Cav. — shrub with red tubular (twisted shut loose petals) flowers; flower buds with long strap-like involucellar bracts up over them; mature fruit orange (but some white fruits?).
- \* *Malvastrum americanum* (L.) Torr. — herb, yellow flowers in elongate hairy inflorescences at end of stems and axils of leaves.
- \* *Pavonia cancellata* (L.) Cav. (= *Pavonia guanacastensis* Standl.) — yellow flowered scandent herbaceous vine.
- Pavonia rosea* Schlecht. — north of La Cruz, leaves pinnately veined, woody herb.
- Peltaea sessiliflora* (HBK.) Standley (= *Pavonia sessiliflora* HBK.) — flowers enclosed by bracts or leaves.
- \* *Sida acuta* Burm. f. — large, elongate distichous leaves, short peduncles, 1 cm petioles, clusters of beige fruits with papery calyx at nodes, distinctive pubescence (simple hairs).

- \* *Sida ciliaris* L. — pink flowers, tiny short narrow leaves.
- \* *Sida glutinosa* Commers — clusters of tiny fruits on 1 cm peduncles.  
*Sida jamaicensis* L.
- \* *Sida linifolia* Juss. — very long narrow leaves, only *Sida* with entire leaf margins.  
*Sida pyramidata* Desp. — big leaves, big clusters of tiny fruits at ends of branches, yellow flowers.
- \* *Sida rhombifolia* L. — varies strongly in leaf size, shape, sessility of flowers, but generally 1–2 cm peduncle, distinctive pubescence (stellate pubescence).
- \* *Sida savannarum* K. Schuman — flowers small to medium, calyx long yellowish pubescent (probably a synonym of *Sida aggregata* Presl.).  
*Sida urens* L. — very hairy dense clusters of hairy fruits in axils.
- o *Sida collina* Schlechtendal (= *Sida corymbosa* R. Y. Fries) — possibly does not occur in Costa Rica.
- o *Sida jussieana* DC. (= *Sida decumbens* St. Hil. and Nand.) — RCM.
- o *Sida lanceolata* C. DC. — probably a synonym of *Sida acuta*.
- o *Sida vussieana* DC. (= *Sida decumbens* St. Hil. and Naud.) — RCM.
- o *Sida spinosa* L.
- \* *Wissadula excelsior* (Cav.) Presl. — elongate spearhead shaped leaves, fruits scattered on long thin peduncles.
- \* *Wissadula* aff. *hirsuta* Presl. — large leaves, very cordate around petiole, fruits scattered singly on long peduncles, hairy stem.  
*Wissadula periplocifolia* (L.) Presl.
- o *Wissadula amplissima* (L.) R. Fries — RCM.

## MARANTACEAE

- Calathea macrosepala* Schum. — creamy yellow flowers, large plant, inflorescence a 4–6 cm long cylindrical cone with large flowers sticking out, inflorescence comes from a leaf bearing stalk, about 10–15 cm below blade.
- Calathea panamensis* Rowlee ex Standley — small, flimsy leaves.
- o *Calathea villosa* Lind. — probably occurs in Guanacaste as is known from dry areas in Puntarenas Prov.
  - o *Calathea allouia* (Aubl.) Lind. — RCM. (impossible!).  
*Ischnosiphon morlaci* Eggers — pubescent inflorescence bracts.  
*Ischnosiphon pruinosis* (Reg.) Peters — glabrous inflorescence bracts (*I. morlaci* and *I. pruinosis* hybridize in disturbed areas).
  - \* *Marantha arundinacea* L. — medium to small herb with 8–10 inch leaves, white flowers in a diffuse inflorescence.  
*Thalia geniculata* L. — blue flowered, herb to 3 m tall in swamps.

## MARTYNIACEAE

- \* *Martynia annua* L. — herb with white purple and yellow tubular flowers, fruit with two recurved spines.

## MELASTOMATACEAE

(= Melastomaceae)

- \* *Clidemia octona* (Bonpl.) L. Wms. — large hirsute leaves, evergreen forest understory, large blue-black fruits on elongate expanded peduncles.  
*Clidemia sericea* D. Don [previously misidentified as *C. rubra* (Aubl.) Mart.] — small very hirsute leaves, sessile purple fruits in axils, tightly clustered, shrub in open sun.  
*Miconia albicans* (Sw.) Tr. — small leaf shrub with yellow beige underside of leaf.
- \* *Miconia argentea* (Swartz) DC. — large leaf tree with beige undersides to leaves, shiny green on top of leaves.  
*Miconia centrodesma* Naud. — large leaves, green glabrous underside of leaves, expanded glabrous inflorescence.
- *Miconia lacera* (Bonpl.) Naud. — RCM.
- \* *Mouriri myrtilloides* (Sw.) Poir subsp. *parvifolia* (Benth.) Morley — shrub in understory of evergreen forest, opposite leaves 1½–3 inches long, no secondary parallel venation visible, glabrous fruits pea-sized with persistent calyx remnants.  
*Ossaea diversifolia* (Bonpl.) Cogn. — Cabo Blanco.
- *Ossaea micrantha* (Sw.) Macf. — higher elevation plant.
- \* *Pterolepis pumila* (Bonpl.) Cogn. — herb with 1–2 inch long leaves, densely pubescent leaves, stem sparsely pubescent, pink flowers, pasture.
- \* *Schwackaea cupheoides* (Benth.) Cogn. — herb with elongate fruits, tiny leaves, very sparse hairs on leaves, pink flowers.

## MELIACEAE

- \* *Cedrela odorata* L. (= *Cedrela mexicana* Roem.) — odoriferous compound leaves; dehiscent fruit that stay connected at the base, seeds winged.  
*Guarea glabra* Vahl. (= *Guarea luxii* C. DC.) — indeterminate pinnate leaves, tree.
- \* *Guarea excelsa* HBK. — tree.
- *Melia azedarach* L. — tree with bipinnate compound leaves, leaflets with strongly toothed margin, fruits fleshy, marble-sized, orange-yellow.
- \* *Swietenia macrophylla* G. King — large deciduous tree; fruit woody pear-shaped (attached at big end) on heavy stalk, dehiscent 10–15 cm long, light beige, filled with tan large samaras.
- *Swietenia humilis* Zucc. — tree.
- *Swietenia mahagoni* Jacq. — might be planted somewhere.
- \* *Trichilia colimana* C. DC. (= *T. anisoplura* C DC., *T. albiflora* C. DC.) — there is a short inflorescence one and a long inflorescence one and 5 names sort to these two.
- \* *Trichilia cuneata* Radlk. (previously called *T. tomentosa* HBK.) — tree with small leaves, 5-7 leaflets, fruits 1 cm long, fruit walls not wrinkled when dry.
- \* *Trichilia hirta* L. — tree.  
*Trichilia glabra* L. (= *T. terminalis* Jacq.) — tree.

- Trichilia havanensis* Jacq. (= *T. oerstediana*) – tree.  
 \* *Trichilia trifolia* L. – trifoliolate leaf small tree.

## MENISPERMACEAE

- \* *Cissampelos pareira* L. – herbaceous vine with red slightly pubescent, 6 mm diameter fruits, small roundish bract-like leaves over fruits, edge of evergreen forest.  
*Hyperbaena tonduzii* Diels. – tree with large oval leaves, long petiole.

## MIMOSACEAE

- \* *Acacia collinsii* Safford (= *A. costaricensis* Schenck) – common dryland ant-acacia with dome-shaped petiolar nectaries, dehiscent brown fruit with yellow pulp, shrub-tree.  
 \* *Acacia cornigera* L. (= *A. nicoyensis* Schenck, *A. spadicigera* Schlecht, and Cham.) – riparian ant-acacia with trough-shaped petiolar nectaries, indehiscent red-maroon banana-shaped fruits, shrub tree.  
 \* *Acacia farnesiana* (L.) Willd. – common pasture shrub to small tree, thorns white, fruits indehiscent brown “bananas” 2–3” long with white dry pulp.  
*Acacia* nsp. Janzen 10362 – flat-top shrub 1–2.5 m tall in large swamps in Río Tempisque flood plain and pastures SW of Liberia, common, flowers a yellow ball, ripe fruits indehiscent brown banana 2–4’ long.  
 \* *Acacia retusa* (Jacq.) R. A. Howard (= *A. riparia* HBK. vel sp. aff.) – rare, zarza (sharp recurved thorns on gray smooth bark), multi-trunk shrub (not a vine) creamy spherical flowers in large sprays in late rainy season, flat pods brown, dehiscent, mature in March-April; patches in lowland old pastures of SRNP, costa of leaflets subcentral at least apically.  
 \* *Acacia tenuifolia* (L.) Willd. [= *A. tamarindifolia* (L.) Willd.] – common zarza (sharp recurved thorns on gray-beige scaly bark), woody vine to 20 m tall, pods slightly dehiscent dark brown flat with a rim, costa of leaflets very close to margin.  
 \* *Acacia villosa* Willd. – common in upland plateau of SRNP, in marshy areas, herb to 1.5 m tall, white elongate inflorescences, annual, flowers and fruits in first half of rainy season, pods flat brown and slightly dehiscent.  
 ○ *Acacia angustifolia* – occurs at 800–1000 m in foothills (esp. along road to Monte Verde in Puntarenas Province).  
 ○ *Acacia dolichostachya* Blake – has been applied incorrectly to *Lysiloma desmochachys* Benth.  
 ○ *Acacia glomerosa* (PAO No. 695) – is a misidentification.  
 ○ *Acacia hindsii* Benth. – does not occur as a wild plant south of the northernmost part of Nicaragua (an ant-plant), despite Holdridge and Poveda 1975.  
*Adenopodia polystachya* (L.) Dixon [= *Entada polystachya* (L.) DC.] – large woody vine with very large brown dense sprays of flowers, fruit wavy flat with

- segments that break out of rim and dark brown epidermis that peels off pod segments; seeds flat discs about 1.5 cm diameter; very wet sites near mangroves.
- \* *Albizzia adinocephala* (Donn. Sm.) Britt. and Rose – scattered medium-sized deciduous tree (to 10 m) on dry hillsides; flowers white on long petioles, pods flat brown wind dispersed barely dehiscent with cream-colored seeds; leaflets up to 2 cm long, 1.5 cm wide borne on 1 cm petiolets.
  - \* *Albizzia caribaea* (Urban) Britt. and Rose – large tree (40" + DBH) with gray bark and conchoidal bark dehiscion scars largely evergreen, lowland swamp tree; fruits beige flat wind-dispersed dehiscent; leaves with tiny leaflets.
  - \* *Albizzia guachepele* (HBK.) Dugand – [= *Albizzia longepedata* (Pitt.) Britt. and Rose, = *Pseudosamanea guachepele* (HBK.) Harms, *Albizzia guachepele* (HBK.) Little] – large tree with leaves like *Pithecellobium saman*; fruits brown flat wind dispersed and borne on 3–6 cm petioles; seeds ivory white like canteloupe seeds.
  - \* *Calliandra confusa* Sragu & Riley – large flowers, north of La Cruz.
  - \* *Calliandra costaricensis* (B. and R.) Standl. – spindly understory herb shrub with flimsy leaves and petioles; white inflorescence on a 3–5 cm long thin peduncle; scattered along lowland road SRNP, 2–3 pairs of pinnae, 3–5 pairs of leaflets.
  - \* *Calliandra emarginata* Benth. (= *Calliandra centralis* Britt. and Rose) – spindly forest understory shrub with white flowers on long peduncles; sets few fruits, 1.5 cm wide, 4–6 cm long, dehiscent; leaflets very large, SRNP.
  - o *Calliandra portoricensis* – old misidentification.
  - \* *Calliandra* sp. (shrub on dry ridges in SRNP).
  - \* *Calliandra tapirorum* Standl. – shrub to small shrubby tree in riparian upland vegetation SRNP; flowers white with pink red ends to anther filaments; 2–3 cm across flowers; tiny leaflets.
- Calliandra tonduzzi* Standl. – shrubby treelet, inflorescences 5 cm diameter, white anther filaments with bright red tips; above waterfall COMELCO; leaflets much larger than those of *C. tapirorum*.
- Calliandra cumingii* Benth. – was incorrectly applied to *Calliandra tonduzii*.
- \* *Desmanthus virgatus* (L.) Willd. – shrub with 3–4 inch dark brown ¼" wide pods that split lenght wise when mature, pods in clusters, seeds at an angle to long axis of fruit and visible through pod wall, inflorescence white and spheroidal.
  - \* o *Entada monostachya* DC. [= *Entada gigas* (L.) Fawe. & Randle] – seeds are often washed up on beaches but an adult plant has never been encountered (huge seeds).
  - \* *Enterlobium cyclocarpum* (Jacq.) Griseb. (= *E. cyclocarpa*) – big tree; fruits round, twisted flat, 10 cm diameter, dark brown indehiscent; seeds ovoid brown with a white-yellow oval ring on each side.
  - \* *Inga vera* Willd. (includes *Inga spuria* H. & B. ex Willd.) – medium large tree along riverbanks, normal green-colored *Inga* fruit, alate petioles and petiolar nectaries.
- Leucaena trichodes* Benth. (= *Leucaena multicapitula* Schery) (= *L. aff. cruziana* ??) – common tree in the moist area just south of Peñas Blancas, 10–15 inch bipinnate compound leaves, leaflets up to 1½ inch long, look like *Albizzia adinocephala* leaves, pod dry up to 7" long, in big cluster.

- *Leucaena leucocephala* (Lam.) de Wit [= *Leucaena glauca* (L.) Benth.] — rare semi-ornamental tree around houses; dehiscent pods flat and brown in dense cluster, 2 cm wide and 10–20 cm long; flowers white.
- \* *Lysiloma auritum* (Schl.) Benth. — medium-sized tree with upper branches very smooth and gray, very large petiolar nectaries and as many as 15 pinnae per leaf, stipules developed into a large leaf blade that persists some time (especially on saplings).
- \* *Lysiloma desmostachys* Benth. — smooth to slightly shaggy bark deciduous tree with beige flat wind-dispersed, tardily dehiscent, 2 cm wide 4–8 cm long, seeds beige.
- \* *Lysiloma seemannii* Britt. and Rose — shaggy barked deciduous tree; pods flat glabrous undulating dehiscent along edges, 2–3 cm wide by 8–12 cm long, shiny reddish brown, leave rim as a separate item; seeds look like gray canteloupe seeds.
- Are *L. auritum* and *L. desmostachys* the same thing?
- \* *Mimosa albida* Humb. and Bonpl. — flimsy shrub to 1 m tall, spiny, enormous leaflets, only 4 to a leaf.
- \* *Mimosa dormiens* Humb. and Bonpl. — herb prostrate on dried up bottoms of reservoirs SRNP; tight clusters of many 2-seeded fruits (unequal-sized sections); very prominent yellow recurved spines on the undersides of leaf midrib and numerous spines on the round and somewhat hairy stem; flowers pinkish white.
- \* *Mimosa* aff. *eurycarpa* Rob. — shrub with pendant white spicate inflorescences, wicked recurved thorns on internodes, dry brown 2" pod with dense ¼" spines all over.
- \* *Mimosa guanacastensis* Standl. — very spiny spreading shrub on dry ridges in SRNP; flowers pink; fruits rust red 2–4 cm long with dehiscent sections, covered with many short stiff spines, 3–5 mm wide.
- Mimosa polycarpa* Kunth. — very spiny flimsy annual shrub to 1.5 m, common in pastures; pink flowers, leaf has only two pinnae; fruits look like *M. pudica* fruits, pubescence appressed.
- \* *Mimosa pigra* L. — spiny spreading shrub in moist places; brown fruits densely hairy, breaking into many elongate rectangles leaving a rim; flowers pink.
- \* *Mimosa pudica* L. — very sensitive semi-perennial scandent herb with pink flowers and dense clusters of spiny flat fruits.
- \* *Mimosa pusilla* Benth. — small single-stem shrub with balls of small spiny pods, few spines on stem, leaflets small, not sensitive.
- \* *Mimosa quadrivalis* L. [= *Schrankia quadrivalis* (L.) Morrill] — scandent flimsy angular square stem annual with 10–15 cm long spiny angular dehiscent beige pods (3–4 mm in x-section); dark pink flowers.
- \* *Mimosa skinneri* Benth. ? — herbaceous with 3 hefty recurved hooks on top end of internode just below leaf; large leaflets; very hairy stem.
- \* *Mimosa teledactyla* D. Sm. ? — thornless, very hirsute stems, roadside herb.
- *Mimosa invisa* Mart. — there are no records of this from Guanacaste; the *Mimosa polycarpa* was often called *M. invisa*.
- Mimosa somnians* Humb. and Bonpl. — RCM, glandular pubescent.
- *Mimosa velloziana* Mart. — looks like a scandent climbing *M. albida* in foothills above Esparza; probably at 500 m in Guanacaste.

- \* *Neptunia plena* (L.) Benth. — floating herb with white corky hollow stems; flowers yellow; in marshes at COMELCO; only *Neptunia* in Guanacaste.
- “*Neptunia lutea*” — was applied in early determinations.
- \* *Piptadenia flava* (Spreng.) Benth. — shrub with beige dry thornless pods, white stripes on stems, wicked recurved thorns, tiny leaflets, medium-sized leaves, top of dry ridge north of Playa Naranjo, SRNP (this determination needs further examination).
- \* *Pithecellobium lanceolatum* (H. and B.) Benth. — common shrubby tree in large swamps (e. g., COMELCO) with glabrous leaflets; fruits dehiscent 5–10 cm long, brown, somewhat spiral, thick and massive walls, inflorescence longer than that of *P. oblongum*, red aril around olive-drab seeds.
- Pithecellobium longifolium* (H. & B.) Standl. — shrub along rivers.
- \* *Pithecellobium mangense* (Jacq.) Macbr. — very rare deciduous tree in SRNP (3 known individuals); large amounts of yellow white mimosoid globular flowers in March; pods yellow-beige, very slightly dehiscent, flat curved, 8–15 cm long, mammal-eaten, seeds bright gray; 1 or 2 spines at nodes.
- \* *Pithecellobium* (= *Pithecolobium*) *oblongum* Benth. — deciduous shrubby spring treelet to 4 m tall, scattered individuals along swamp edges near Palo Verde and at mangrove edges in SRNP; fruits dehiscent thin-walled red (almost glowing with sun shining through) helix with shiny black seeds and a white aril; fruits in late March through early April; inflorescence white cylindrical 1.5 cm long.
- \* *Pithecellobium saman* (Jacq.) Benth. — large deciduous tree along upper swamp edges and riparian habitats; flowers white and pink; indehiscent 10–20 cm fruits dark brown eaten entire by mammals with molasses-like material in pod wall; seeds dark brown.
- \* *Pithecellobium platylobum* (Spreng.) Urban — woody vine with large recurved spines; flowers white on a long peduncle; fruits indehiscent, dark brown, slightly undulating, 2–3 cm wide, 10–15 cm long; seeds dark brown shiny and extremely flat, oval, 1.5 cm long, riverbeds and dry ridge SRNP.
- *Pithecellobium dulce* (Roxb.) Benth. — is probably a misidentification for *P. lanceolatum* or *P. oblongum*.
- Pithecellobium pseudotamarindus* Standl.
- *Pithecellobium pachypus* Pittier.
- \* *Prosopis juliflora* (Sw.) DC. — shrubby tree with long spines on branches; fruits indehiscent beige 1–2 cm wide, flat, somewhat curved, 10–15 cm long.
- *Prosopis chilensis* (Mol.) Stuntz. — should not be applied to Costa Rican specimens.

## MORACEAE

- \* *Brosimum* sp. — large tree in the lowlands of SRNP, rough bark with exfoliating disks of bark (Hartshorn, pers. comm.).
- \* *Brosimum alicastrum* Swartz. — large tree with gray smooth bark, large buttresses, milky latex, evergreen, marginal vein around leaf, fruit 2–3 cm diameter with 1.5 cm smooth spheroid gray seed inside.



- *Brosimum costaricanum* Liebm. — has been incorrectly (?) applied to *Brosimum alicastrum* Swartz in Guanacaste.
- \* *Castilla elastica* Cerv. — medium-sized tree with copious white latex, smooth trunk, horizontal branches with large leaves hanging off sides at regular intervals; fruits orange clusters of 1–2 cm diameter fruitlets on an open-faced sessile 5–7 cm diameter fruit, evergreen.
- \* *Cecropia peltata* L. (= *C. asperrima* Pitt.) — small dioecious tree without milky latex, hollow trunk with nodal septae, large peltate palmately compound leaves, fruits like a hand of sausage-shaped inside-out figs; occupied by two species of *Azteca* ants that get their carbohydrate food from white Mullerian bodies produced by the trichilia (furry pads) at the base of the petiole, and their proteins and oils from harvesting the mealy bugs (Homoptera) that they rear inside the hollow stem, primarily in riparian sites.
- \* *Chlorophora tinctoria* (L.) Gaud. [= *Maclura tinctoria* (L.) Don] — medium sized dioecious tree with 2' catkins on males and green-brown marble-sized fruits (with hundreds of minute seeds) on females, leaf margins strongly toothed, leaves on juveniles with strong large notch, strongly dentate leaves (serrate), juvenile plants with well-developed spiny branches.
- Dorstenia contrajerva* L. — herb, leaves look like maple leaves, infructescence a frilled edge square or rectangle, very irregular.
- \* *Dorstenia drakena* L. — herb, very deeply lobed leaves, elliptical infructescence with entire regular margin.
- \* *Ficus cotinifolia* HBK. — subsessile figs with a rim of raised tissue around the ostiole, figs 1–1.5 cm in diameter, red when ripe.
- \* *Ficus hondurensis* Standley — tree with densely, tomentose leaves below, 1.5 cm diam purple-red figs when ripe, almost subsessile figs, small leaves.
- \* *Ficus goldmanii* Standl. — large spreading pasture and roadside trees with large shiny elliptical leaves; glabrous green figs 2–3 cm diameter.
- \* *Ficus insipida* Willd. (= *Ficus glabrata* HBK.) — narrow lanceolate 5–7" leaves, pale green canopy, beige bark, ripe figs 3–5 cm diameter green with white elongate flecks, often fall into water.
- Ficus maxima* Mill.
- \* *Ficus morazaniana* Burger — 2–3 cm diameter green tomentose figs; slightly tomentose leaves on underside, not a strangler, tree.
- Ficus obtusifolia* HBK. — large riparian tree with 2–3 cm diameter green tomentose figs with white dots on them, large glabrous leaves.
- \* *Ficus ovalis* (Liebm.) Miq. — figs 1.5 cm diameter red-purple on long pedicel, no raised rim around ostiole, leaves glabrous.
- \* *Ficus popenoei* Standley — large tree with 2–3 cm diameter green tomentose figs with ostiole in a strongly sunken cavity, tomentose leaves on underside.
- Ficus trachelosyce* Dugand.
- *Ficus werckleana* Rossberg — probably not in Guanacaste. (*Ficus* requires many more Guanacaste collections).
- \* *Trophis racemosa* (L.) Urban — shrub to medium-sized tree, juicy fruit globose, often with a narrow collar at the apex, smooth, becoming rose red when mature.

## MORINGACEAE

- *Moringa oleifera* Lam. — ornamental weak shrub, pendant angular 10–20 cm long beige fruits, triangular in X-section, seeds winged inside, looks like *Bignoniaceae*.

## MUSACEAE

(see *HELICONIACEAE*)

## MYRSINACEAE

- Ardisia compressa* HBK. — evergreen shrub with smaller more acuminate leaves, small inflorescence, short fruit-bearing branches.
- \* *Ardisia revoluta* HBK. — evergreen shrub with large leaves lacking secondary venation, black-red berries in large clusters.
- Stylogyne ramiflora* (Oerst.) Mez. — inflorescences axillary or on very short shoots.

## MYRTACEAE

- Calyptranthes pallens* Griseb. var. *williamsii* (Standl.) Mac Vaugh (= *Calyptranthes costaricensis* Berg) — small tree, white flowers, riparian forest, blunted acuminate glabrous leaves, calyx circumcissle.
- \* *Eugenia hypargyrea* Standl. — less branched inflorescence, leaves thick and rounded at end but smaller than *E. salamensis*, fruits elongate ovals up to 1.5 cm long.
- Eugenia oerstediana* Berg — small flimsy leaves, 6 mm diameter red round fruits on 1–2 cm peduncles.
- \* *Eugenia salamensis* Donn. Sm. — large leaves, fruits up to 2 cm diameter and yellow orange (*Psidium rensonianum* was incorrectly applied to this plant in the late 1960's and by Standley in the Flora of Costa Rica).
- \* *Psidium guajava* L. — commercial guava, twisted trunk tree with reddish bark.
- \* *Psidium guineense* Sw. — open grassland shrub with extensive swellings on stem (galls), marble-sized fruits.
- \* *Psidium salutare* (HBK.) Berg — shrub, white flowers, small oval leaves, very glabrous.
- Psidium sartorianum* (Berg) Ndzu. — small leaf shrub with narrow acuminate glabrous leaves.

## NAJADACEAE

- \* *Najas guadalupensis* (Magnus) Sprengel var. *guadalupensis* — submerged aquatic herb.

## NYCTAGINACEAE

- \* *Boerhaavia erecta* L. — herb, purple flowers, blunt fruits look like minute *Pisonia* fruits, fruits on a long peduncle.
- o *Boerhaavia caribaea* Jacq. (= *Boerhaavia diffusa*) — *Boldoa* (= *Salpianthes*) *purpurascens* (Dav.) H. and A. — herb with greatly exploded inflorescence, almost alate petiole, glabrous leaves, somewhat angular stem, large flimsy leaves.
- o *Bougainvillea buttiana* Holttum ex Standl. — leaves rounded or truncate at the base; bracts crimson or orange, usually rounded or obtuse at apex; cultivated garden plant.
- o *Bougainvillea glabra* Choisy — leaves acute or acutish at base; bracts purplish or magenta and usually pointed at apex; cultivated garden plant.
- o *Bougainvillea spectabilis* Willd. — very pubescent plant; cultivated garden plant, introduced, not yet seen in Guanacaste but may be there.
- \* *Mirabilis violacea* (L.) Heimerl. — herb, purple flowers, several flowers in a large green bract.
- \* *Neea psychotrioides* Donn. Smith — looks like Rubiaceae, shrub, understory, elongate leaves.  
*Pisonia aculeata* L. — shrub with strongly recurved spines, fruits small, leaves tend to be pubescent.
- \* *Pisonia macranthocarpa* Donn. Smith — fruits on long multi-branched peduncles, five sticky ridges on each of the dry fruits, fruits fall to ground, presumably mammal dispersed, straight spines.

## NYMPHAEACEAE

*Nymphaea blanda* G. F. W. Mey. — white-flowered pond lily in swamps.

## OCHNACEAE

- \* *Ouratea lucens* (HBK.) Engler — yellow flowers, understory shrub, large entire glabrous leaves, green fruits 2–4 per bright red fruit base, glabrous, juicy, 1 cm long fruits.
- \* *Sauvagesia pulchella* Planch. — fimbriate stipules, minute herb up to 6" tall, tiny oval leaves.

## OLACACEAE

- \* *Schoepfia schreberi* J. F. Gmel. — small tree with very brittle medium small dark green leaves, oak forest, dark red axillary small flowers with yellow anthers, wad of fibrous tissue in axils of leaves.
- o *Schoepfia vacciniiflora* Pl. — higher elevation species.
- \* *Ximenia americana* L. — shrub with single spines, pubescent white petals, marbled-sized slightly oval fruit.

## ONAGRACEAE

- Ludwigia erecta* (L.) Hara — profusely branching erect herbs with sharply 4-angled stem and sessile, yellow flowers; raphe of seed very reduced.
- Ludwigia decurrens* Walt. — highly branching, yellow-flowered herbs with sharply 4-angled, 4-winged stem; raphe of seed very reduced.
- Ludwigia octovalvis* (Jacq.) Raven - yellow-flowered, erect, herbs, often reaching shrubby proportions with round stem; raphe of seed as large as body of seed.
- Ludwigia peploides* (HBK.) Raven (= *Jussiaea repens* L.) — yellow-flowered prostrate herb that forms floating mats on slow-flowing river eddies.

## OPILIACEAE

- \* *Agonandra macrocarpa* L. O. Wms. — small tree, male and female flowers separate, fruit about 1.5 cm long, fleshy yellow.
- *Agonandra obtusifolia* Standl. — only occurs in northern Central America, but was misapplied to Costa Rican collections.

## ORCHIDACEAE

- \* *Brassavola nodosa* (L.) Lindl. — epiphytic with thick upright finger-like leaves in large bunches, flowers large and white and fragrant at night and sphinx moth-visited, tips of leaves blunt.
- \* *Catasetum maculata* HBK. — epiphyte with long strap-like leaves, large masses of white thin upward pointing roots, flower an inverted fleshy bucket several cm across and deep, visited by euglossine bees.
- \* *Encyclia cordigera* (HBK.) Dressler — epiphyte with spray of 3–12 brown, white and purple flowers, fat green pseudobulbs, flowers visited by *Xylocopa* bees (flowers look like *Gliricidia sepium* flowers).
- Epidendrum difforme* Jacq. — epiphyte with an umbel of light green fragrant flowers.
- \* *Epidendrum stamfordianum* Batem. — large epiphytic plants up to 8 dm. tall. Pseudobulbs stipitate, slender, fusiform tapering into a long jointed stalk, 2–4 leaved. Flowers fragrant, greenish-yellow spotted with red. Butterfly pollinated.
- Habenaria pauciflora* (Lindl.) Rchb. f. — flowers yellowish-cream, inflorescence few-flowered. Terrestrial.
- Habenaria petalodes* Lindl. — inflorescence densely flowered.

### KEY

- \*: Known to grow in Santa Rosa National Park.
- RCM: Names used as a very probable misidentification of a plant collected at Santa Rosa National Park by Ross Callaway; these names usually apply to plants in Mexico or northern Central America, or from wetter sites in Costa Rica.
- : Questionable determination, name use, geographic origin, etc.
- : Cultivated or ornamental in Guanacaste.

- \* *Habenaria quinqueseta* (Michx.) Sw. — flowers large, white. Inflorescence lax. Terrestrial.
- \* *Hexadesmia*.
- \* *Laelia rubescens* Lindl. — epiphyte with 2 ft. long inflorescence stems, lavender flower 3–5 cm across, discoid pseudobulb that is copper-red in the dry season.
- \* *Laelia tibicinis* (Batem. ex Lindl.) L. O. Williams — plant up to 3 m tall with hollow fusiform-elongate pseudobulbs which are usually infested with black ants. Flowers large, bright purple magenta. The species name comes from the fact that the hollow cylindrical stems are used as trumpets by native children.
- Lepanthes rotundifolia* L. Wms.
- \* *Oncidium cebolleta* Sw. — fleshy cylindrical pointed 15–30 cm purple-green-brown leaves; flowers yellow with light brown-purple maculations, all petals in one plane, flower 1–2 cm wide, 2–10 flowers per inflorescence; small plants with 1–3 leaves at a time; occasional on *Crescentia* trees.
- Pleurothallis* of. *calyptrosteale* Schltr.
- Pleurothallis* cf. *blaisdellii* S. Wats.
- \* *Polystachya masayensis* Reichb. — small epiphytic plants less than 25 cm tall, bearing a simple or branched raceme of greenish-yellow flowers. Callus on the lip with short mealy hairs act as pseudo-pollen to attract pollinators.
- \* *Spiranthes orchioides* (Sw.) A. Rich — terrestrial orchid that produces a 40–70 cm tall apparently chlorophyll-free inflorescence with tubular red-orange flowers at the top in burned old pastures in the first two months of the rainy season; has underground beige fleshy tuber-like structures.

## OXALIDACEAE

- \* *Oxalis frutescens* L. (= *Oxalis neaei* DC.) — yellow flower, trifoliolate.

## PALMAE

- \* *Acrocomia vinifera* Oerst. — the common tall (3–10 m) pasture palm tree with round fruits and bottle brush spiny leaves; dry hillsides, not in primary forest, only large palm in Guanacaste other than *Scheelea rostrata*.
- \* *Bactris guinensis* (L.) H. E. Moore (= *B. minor* Jacq.) — the common clumped spiny palm to 3 m height, usually in pastures derived from swamps; fruits deep purple-black spheres sweet-sour, 1.5–2.5 cm diameter.
- Bactris major* Jacq. [= *B. balanoidea* (Oerst.) H. Wendl.] — the clumped tall (3–6 m) spiny palm in very wet riparian sites (e. g., Río Tempisque mouth flood plain); fruit purple oval sour-sweet 3–5 cm long; endangered as riparian vegetation is endangered.
- Cocos nucifera* L. — coconut palm; there are several varieties with different sizes and shapes of mature fruit.
- \* *Scheelea rostrata* — the rare tall (4–15 m) riparian-swamp forest palm tree with oval orange fruits, 2–4 m long spineless leaves; going extinct as the riparian forests are cut; endangered species in Guanacaste.

## PAPAVERACEAE

- *Argemone mexicana* L. – herb with large white flowers, poppy.

## PASSIFLORACEAE

*Passiflora biflora* Lam. – north of La Cruz.

*Passiflora filipes* Benth. – flimsy, blunt ended broad leaf, 1 cm wide flower.

\* *Passiflora foetida* L. – glandular hairs.

\* *Passiflora pedata* L. – palmately compound leaves.

\* *Passiflora pulchella* HBK. – 2–3 cm diameter flowers, y-shaped broad leaf, wiry plant.

\* *Passiflora platyloba* Killip. – large 3-lobed leaf, leaf-like bracts around flowers and fruit.

## PHYTOLACCACEAE

*Microtea debilis* Sw. – herb, tiny round black reticulate fruit, flimsy leaves, Taboga only.

\* *Petiveria alliacea* L. – herb, strong rank odor, seed a heavy stick-tight with strong spines.

\* *Rivinia humilis* L. – bright red glabrous berries, herb, flimsy leaves.

\* *Stegnosperma cubensis* A. Rich. – shrub to small tree, pendant clusters of 3 valved, fleshy-woody fruits, seed black with a white aril.

*Trichostigma octandrum* (Loess.) H. Walter – west of Santa Cruz.

## PIPERACEAE

*Peperomia cyclophylla* Miq. – small opposite-leaved with rounded laminae, bracteate peduncle, and puberulent leaf-margin.

*Peperomia macrostachya* (Vahl.) A. Dietr. – thick succulent scandent or pendant plants, leaves alternate.

*Peperomia obtusifolia* (L.) A. Dietr. – very thick alternate leaves, laminae that are usually narrowly obovoid and attenuate at the base, bracteate peduncle or compound inflorescence.

*Peperomia pellucida* (L.) HBK. – unusual fruit, glabrous parts drying very thin, and apparently short-lived weedy habit, leaves alternate.

*Peperomia pseudo-dependens* C. DC. – weak-stemmed plants with thin rounded leaves, and spikes with the flowering parts in a distinct spiral or in bands, leaves alternate.

*Peperomia rotundifolia* (L.) HBK. – very small round to elliptic alternate leaves on slender creeping stems with roots at most nodes.

\* *Piper amalago* L. – flimsy medium-sized shrub with glabrous small broad leaves (almost round), white short upright inflorescence, common in evergreen forest understory.

*Piper auritum* HBK. — large unequally cordate leaves and the shoot apex emerging from within the leaf-base at flowering nodes.

*Piper guanacastense* C. DC. — to medium-sized shrub with very lanceolate glabrous leaves.

- \* *Piper jaquemontianum* Kunth — large glabrous broad acuminate leaves above, tomentose midveins on underside, shrub.
- \* *Piper marginatum* Jacq. — to large shrub with very large heart-shaped leaves, long drooping inflorescence, flimsy stems, many stems per plant, long internodes, leaves glabrous on underside.
- \* *Piper pseudo-fuligineum* C. DC. — to medium shrub with moderately narrow leaves, very heavy and distinct veins, very unequal base to leaves, like a lop-sided spearhead.

*Piper reticulatum* L. — to medium-sized shrub with large broad leaves with nearly parallel venation.

- \* *Piper tuberculatum* Jacq. — small somewhat succulent few-stemmed shrub, growing in moist riparian sites, glabrous leaves and stems, reddish cast to the stem epidermis, small leaves.
  - o *Piper aduncum* L. — curved spikes drooping yellow-green foliage (higher elevation species).
  - o *Piper villiramulum* C. DC. — probably an old misapplication.
- Pothomorphe peltata* (L.) Miq. — herbaceous shrub with nearly round peltate leaves, clusters of white inflorescences rather than single ones, light anise odor to crushed leaves.

## PLUMBAGINACEAE

- \* *Plumbago scandens* L. — herb with strikingly glandular calyx.

## PODOSTEMACEAE

*Marathrum minutiflorum* Engler — look like aquatic ferns, rocky streams with fast-moving water.

*Marathrum schiedeanum* (V. Cham.) Tul. — look like aquatic ferns, rocky streams with fast-moving water.

*Tristicha trifaria* (Willd.) Sprengel — looks like an aquatic moss.

## POLEMONIACEAE

- \* *Loeselia ciliata* L. — herb with tightly clustered small leaves with lots of white spines (easily confused with Acanthaceae).
- o *Loeselia aspera* ined. — a misapplication, name does not exist.

## POLYGALACEAE

- \* *Polygala bryzoides* St. Hil – small herb, lanceolate narrow leaves.  
*Polygala glochidiata* HBK. – whorled leaves.
- \* *Polygala leptocaulis* T. and G. – very small herb with 1 mm wide leaves, thin brush inflorescence.  
*Polygala longicaulis* HBK. – small herb with clover-like capitate inflorescence on a long receptacle, leaves at base of stem.
- \* *Polygala variabilis* HBK. – capitate flower head, small leaves all the way up stem.
- o *Polygala costaricensis* Chodat – RC misidentification.
- o *Polygala paniculata* L. – RC misidentification.  
*Securidaca sylvestris* Schlecht. – woody vine with winged fruits (samaras) and purple flowers, looks superficially like a faboid legume, samara attached by seed end, flange on the seed.

## POLYGONACEAE

- \* *Coccoloba* Janzen 10915 – large tree in Park lowlands.  
*Coccoloba acuminata* HBK. – north of La Cruz.  
*Coccoloba caracasana* Meisner – swamp tree with medium sized leaves.  
*Coccoloba padiformis* Meisn. – this may be a misidentification.
- \* *Coccoloba venosa* L. (= *Coccoloba floribunda*) – small oval leaves, shrubby tree-let, 2–4 inch long upright inflorescences.  
*Podopterus mexicanus* Humb. and Bonpl. – shrub with small, winged, white fruits, spiny shrub, swamp edge shrub.  
*Polygonum punctatum* Elliott – gland dots on fruit.  
*Polygonum segetum* HBK. – herb with 3–5" long leaves, narrow, lanceolate.  
*Ruprechtia costata* Meisn. – shrub to small tree with *Triplaris*-like fruit, but half the size, riparian vegetation, dark-colored trunk, small leaves.
- \* *Triplaris melaenodendron* (Bertol.) Standl. and Steyerl. – riparian deciduous (shortly) tree with smooth gray-beige bark that comes off in large scales; fruit a small three-winged shuttle-cock with a single black 3-edged seed; trees in fruit pinkish-orange in color; occupied by *Pseudomyrmex triplaris* ants; only *Triplaris* in Guanacaste (known in old literature as *T. americana*).

## PONTEDERIACEAE

- Eichornia crassipes* (Mart.) Solms. – water hyacinth.
- Heteranthera limosa* (Sw.) Willd. – blue flowered pond herb with 1 inch long almost heart-shaped leaves.
- Heteranthera peduncularis* Benth. – bigger and more deeply cordate leaves, herb, aquatic.
- Heteranthera reniformis* Ruiz and Pavon – very deeply cordate small rounded leaves, herbaceous weed, aquatic.



## PORTULACACEAE

- \* *Portulaca oleracea* L. — rounded end to leaf, relatively glabrous, herb.
- \* *Portulaca pilosa* L. — tufts of pubescence around stems, very narrow leaves, herb.

## PROTEACEAE

- \* *Roupala montana* Aubl. (= *R. complicata* Kunth.) — shrub, compound and simple leaves, inflorescence a long bottle-brush, oval leaves with broad apical point.

## RANUNCULACEAE

- \* *Clematis dioica* L. — vine, opposite trifoliolate leaves, large sprays of tiny cream-white flowers.

## RHAMNACEAE

- \* *Colubrina spinosa* Donn. Sm. — shrub, euphorb-like fruit.
- \* *Gouania polygama* (jacq.) Urban — semi-woody vine; one long curled tendril at end of each lateral branch; leaves hirsute, oval; stipules paired, leaf shaped; tiny white flowers on 6 cm elongate inflorescence; stem hairy and red with multiple ridges on it; immature fruit finely short pubescent.
- \* *Karwinskia calderoni* Standl. — tree, opposite leaves, long petiole, 3"—4" long lanceolate leaves, fruits green to black pea-sized and —shaped calyx grasps base of fruit, fruits on hooked peduncles scattered along branches.
- o *Sarcomphalus* — doubtful, West Indian genus.
- \* *Zizyphus guatemalensis* Hemsl. — shrub to medium-sized tree with single thorn at many nodes; leaves rather round with curving parallel venation; fruits a green 1—2 cm diameter sphere, turning yellow to beige and falling from the tree completely in early July (SRNP), flesh sweet with a 7—10 mm diameter nut inside; riparian flatland vegetation, large individual over picnic area at Playa Naranjo, SRNP, leaves glabrous beneath.  
*Zizyphus mauritiana* Lam. — heavily pubescent undersides of leaves, tree with wicked recurved hooks on branches.

## RHIZOPHORACEAE

- \* *Rhizophora mangle* L. — mangrove with elongate seed-seedling.

RUBIACEAE

- \* *Alibertia edulis* A. Rich. — 1 to few flowers or fruits between terminal pair of leaves, common shrub, evergreen fruit dry brown 2–4 cm diameter, “raisin” tasting with many 3–5 mm diameter, disk-shaped seeds.  
*Borreria densiflora* DC.  
*Borreria laevis* (Lam.) Griseb.  
*Borreria ocimoides* (Burm.) DC.  
*Borreria suaveolens* Meyer.
- \* *Calycophyllum candidissimum* (Vahl.) DC. — common large tree with red and white shaggy patchy bark, twisted and grooved trunk; one sepal lobe forms white blade.
- \* *Chimorrhis parviflora* St. — small tree, terminal panicle of flowers.
- \* *Chiococca alba* (L.) Hitchc. — inflorescences from axils of leaves, fruit flattened, 5–10 mm disc, vine to shrub.
- \* *Chomelia spinosa* Jacq. — shrub to tree, spines on stem, inflorescences axillary, flowers tend to be in candelabra-like cluster or only slightly branched at end of peduncles. Inflorescences axillary, fruit black oval single nut berry 1.5 cm long.
- \* *Coutarea hexandra* (Jacq.) Schum. — white buds and flowers strongly curved, inflorescence terminal, fruit flattened and lenticellate, small tree or shrub.  
*Crusea parviflora* H. & A. — *Borreria*-like herb.
- \* *Declieuxia fruticosa* (Willd.) Ktze. [= *Declieuxia fruticosa* var. *mexicana* (DC.) Standl.] — inflorescences terminal tending to be scorms, herb, ercoid in habit, with narrow deep-green glossy leaves.  
*Diodia rigida* (Willd.) S. & C. — *Borreria*-like herb.  
*Diodia teres* Walt. — *Borreria*-like herb.  
*Exostema caribeaum* (Jacq.) Roem. & Schult. — flowers axillary in upper leaves, narrow corolla tube with long narrow corolla lobes.
- \* *Exostema mexicanum* A. Gray — flowers in terminal panicle, smaller, tree or shrub, the anthers on long exerted filaments the slender elongate petals reflexed.
- \* *Faramea occidentalis* (L.) A. Rich. — tree; flowers white; glossy-green oblong leaves; elongate slender flower, buds resemble a lance, the flowers are well spaced in a large wide open inflorescence; fruits rotund and smooth, the size of a small grape, capped by a calycine crown.
- \* *Genipa americana* L. (= *Genipa caruto* HBK.) — inflorescence compact, terminal, 1 to 12 yellow flowers in rainy season, cut surfaces of fruit turning purplish blue ca. half an hour after exposure to air, fruit spheroid at branch ends 3–5 cm diameter with many seeds and persisting through dry season (as immature), sweet pulp around large seeds when ripe.  
*Geophila herbacea* (Jacq.) K. Schum. — crawling on ground; leaves cordate at base; fruits red.

- Geophila repens* (L.) I. Johnston — herb crawling on ground; leaves cordate at base; fruits red.
- Gonzalagunia panamensis* (Cav.) Schum. — shrub, terminal spike or raceme of flowers; the inflorescence usually is curved and pendant; flowers white.
- \* *Guettarda macrosperma* D. Sm. — shrub to tree, no spines, flowers in slightly branched inflorescences or in clusters at end of peduncle, inflorescences axillary, flower more robust than in *Chomelia spinosa*. Fruits with a felt-like indumentum, red, 2 cm in diameter.
  - o *Guettarda deamii* Standley — probably misidentification (shrub, leaves small; leaves densely hairy, fruits cherry-like *in vivo*, densely pubescent).
  - \* *Hamelia patens* Jacq. — shrub to small tree orange-tubular flowers, flowers in branches scorms (flowers on one side of branches), fruits glabrous, deep purple-black when ripe (green-orange when immature), single seed, fruits 1–2 cm long.
  - Hamelia storkii* Standl.
  - \* *Ixora floribunda* (A. Rich.) Griseb. — small tree, inflorescence terminal branched like a *Psychotria*, calyx unlobed or slightly lobed, the corolla lobes are contorted, fruits red glabrous spheres to 1 cm diameter.
  - \* *Lindenia rivalis* Benth. — Growing at edge of streams or rivers, 1 m shrub. Flowers 5 to 15 cm long, narrow tubular, corolla white; valves of mature fruits curved.
  - Oldenlandia lancifolia* (Schumach) DC. — delicate herb with linear leaves with one or few pedicellate flowers in leaf axils.
  - Posoqueria latifolia* (Rudge) R. & S. — small to medium size tree, leaves glabrous thick, flowers white, elongate narrow tubular with the corolla lobes turned to one side like the head of a golf club, only in wet areas.
  - \* *Psychotria carthaginensis* Jacq. — shrub to 4 m — leaves narrowly obovate, lanceolate, attenuate acute at base; inflorescence terminal paniculate, ovate-rotund in shape, the peduncles wiry.
  - \* *Psychotria horizontalis* Sw. — shrub to 2 m with white flowers, leaves usually with minute holes where lateral veins join mid-vein lowermost branches of inflorescence of 5, radiately disposed.
  - \* *Psychotria microdon* (DC.) Urban — 50–100 cm tall, common understory perennial very small shrub with glabrous leaves, clusters of large (1 cm long corolla) white flowers at end of shoot.
  - \* *Psychotria nervosa* Sw. — shrub with crinkly margins and leaves, red, glabrous berries.
  - \* *Psychotria oerstediana* Standl. — shrub to 2 m leaves oblong, the blade contracted toward base, the petiole short or absent, inflorescence much shorter than leaves; inflorescence up to 4 cm long, often the branches radiate.
  - Psychotria psychotriaefolia* (Seem.) Standley — low shrub with usually lanceolate leaves tapering to base; inflorescences much shorter than terminal leaves, flowers usually in small clusters borne on radiate branches arising from stem tip.
  - \* *Psychotria pubescens* Sw. — shrub 2–3 m; leaves yellow-green, very thin (membranous) inflorescences usually hemispherical and shorter than terminal leaves; internodes of youngest twigs often contracted immediately below nodes.
- Randia* is in a state of confusion and needs to be monographed.
- Randia aculeata* L. — small leaves, leaves thicker than in *Randia karstenii*.

- \* *Randia albonervia* vel sp. aff. (= *B. leucocarpa*?) (DHJ 10936) — shrub-small tree.
- \* *Randia echinocarpa* DC. — shrubby small tree with white large flowers (to 5 cm long), 4 spines at nodes.
- \* *Randia karstenii* Polak — small (tiny) leaves, leaves thinner than in *Randia aculeata*, shrub with dense fur of tiny leaves along nearly horizontal branches, small white flowers.
- \* *Randia lasiantha* Standley — larger leaves, pubescence on margins of leaves, spreading.  
*Randia spinosa* (Thunb.) Poir — leaves larger, pubescence on margins of leaves, not spreading.
- o *Randia subcordata* Standl. — name used for collection now identified as *Randia lasiantha*. If present, we would expect larger almost cordate leaves.
- \* *Richardia scabra* L. — *Borreria*-like herb. Inflorescence more terminal, bracts larger, and hairs of pubescence usually longer than in *Borreria*.

## RUTACEAE

- o *Citrus aurantifolia* (Christm.) Swingle — lemon.
- o *Citrus aurantium* L. — sour orange.
- o *Citrus limetta* Risso — lime.
- o *Citrus paradisi* Macf. — grapefruit.
- o *Citrus reticulata* Blanco (= *C. nobilis* Tenore) — tangerine.
- o *Citrus simensis* (L.) Osbeck — sweet orange.
- \* *Essenbeckia litoralis* Donn. Sm. — small tree with trifoliolate leaves; 5-lobed angular solid fruit 2–3 cm in diameter, gland dots on leaves.
- \* *Xanthoxylum culantrillo* HBK. — bushy shrub with small, pinnately compound leaves; wicked recurved spines on stems; grassland-forest edges.
- \* *Xanthoxylum setulosum* P. Wilson — tree with heavy spines on trunk, pinnately compound large leaves, saplings have numerous sharp dark spines on trunk.
- o *Xanthoxylum procerum* — doubtful identification.

## SAPINDACEAE

- \* *Allophyllus occidentalis* (Sw.) Radlk. — treelet with trifoliolate tomentose leaves; fruits orange-red 5–10 mm diameter fleshy berries on 10 cm spike at branch ends.
- \* *Cardiospermum grandiflorum* Sw. — vine with balloon fruit, 9-foliolate flimsy leaf.
- \* *Cardiospermum halicacabum* L. — vine with balloon fruit.
- \* *Cupania guatemalensis* (Turcz.) Radlk. — (previously misidentified as *Cupania americana* L.) — 3-parted velvet “trichillia” fruit about 2 cm diameter, leaves with large marginal teeth.
- \* *Dipterodendron costaricensis* Radlk. — tree in moist forest with compound leaves with toothed margins, looks superficially like a *Jacaranda* leaf.

- Dodonaea viscosa* (L.) Jacq. — small shrub with papery 3-winged spheroidal fruit, leaves elongate and simple, shiny.
- Paullinia costaricensis* Radlk. — less than 1 cm diameter velvety fruits, 9-foliolate.
- \* *Paullinia cururu* L. — trifoliolate, winged rachis.
- Paullinia pinnata* L. — vine with alate petiole and 5 leaflets, riparian vegetation.
- \* *Paullinia* maybe snp. RL4246.
- Paullinia fuscescens* HBK. — west of Nicoya, near La Cruz.
- Sapindus saponaria* L. — leaf narrowly alate; ripe fruits amber indehiscent spheres 2 cm diameter, single round black seed inside.
- Serjania atroliniata* Sauv. and Wr. — 9-foliolate, leaves with teeth at end of leaflets, fruit glabrous, gland streaks on leaflets.
- Serjania caracasana* (Jacq.) Willd. — elongate leaflets, fruit 2X as large as *S. schiedeana*.
- \* *Serjania mexicana* (L.) Willd. (= *S. pteropoda* Standl.) — entire leaf margins, 9-foliolate, glabrous fruit wall.
- \* *Serjania schiedeana* Schlecht. (= *S. rhombea* Radlk.) — heavily toothed leaflet margins, hairy fruit wall below the wing.
- Thouinia villosa* DC. — shrub with trifoliolate leaf like *Allophyllus*, but fruits are small samaras.
- \* *Thouinidium decandrum* (Humb. and Bonpl.) Radlk. — tree with compound leaves with striking white mid-veins on underside of 8–10 cm lanceolate leaflets; sprays of white flowers; samaras glabrous in 2's or 3's and size and appearance of maple keys.
- \* *Urvillea ulmacea* HBK. — slightly inflated in center, 3-foliolate, 3-winged fruit, 1.5 cm long with distinctive pressed-in edges.

## SAPOTACEAE

- Bumelia celastrina* HBK. — small roundish leaves.
- Bumelia persimilis* Hemsley (= *Bumelia pleistochasia* D. Sm.).
- Bumelia obtusifolia* Roem. and Schult.
- *Chrysophyllum cainito* L. — leaves golden brown below, tree.
- Dipholis minutiflora* Pittier.
- \* *Manilkara zapota* (L.) V. Royen (= *Achras zapota* L.) — large tree with non-toxic copious white latex (chicle of commerce), common in uncut lowland moist areas, nearly evergreen, fruits brown 2–4 cm diameter with 4–8 smooth seeds lying on radii, sometimes referred to incorrectly as *Manilkara achras* (a specimen collected a few kilometers south of La Cruz has been identified as *Manilkara chicle* (Pittier) Gilly, which suggests that there are two species of *Manilkara* among what is called *Manilkara zapota* all over Guanacaste; *M. chicle* has 3–5 flowers per axil while *M. zapota* has but one).
- \* *Mastichodendron capiri* (A. DC.) Cron. — large tree with simple leaves in whorls at branchlet ends, ripe fruit fleshy green to beige 3 cm diameter ovoid sphere with one large spheroidal seed.
- *Pouteria* — RCM.

## SCROPHULARIACEAE

- Angelonia angustifolia* Benth. — blue flowers, small herb, terminal flower spike.  
*Bacopa sessiliflora* (Benth.) Edwall. — elongate leaves, serrate edges on distal half, alate petiole, small herb, semi-aquatic.  
*Bacopa tweedii* (Benth.) Parodi — very round leaves.  
\* *Buchnera pusila* HBK. — herb with white flowers, sparse pubescence on dark-red stem.  
*Capraria biflora* L. — shrubby herb with multiple small dry fruits on 1–2 cm peduncle.  
*Lindernia crustacea* (L.) F. Muell. — tiny herb with roundish (1–2 cm diameter) toothed leaves.  
*Mecardonia procumbens* (Mill.) Small [= *Bacopa procumbens* (Mill.) Small] — semi-aquatic small herb, short and rounder leaves than *Bacopa sessiliflora*.  
\* *Russelia sarmentosa* Jacq. — 1–2 m herb with tubular red flowers.  
\* *Scoparia dulcis* L. — tiny leaves, herb.  
*Stemodia durantifolia* (L.) Sw. — herb with whorled leaves and flowers.

## SIMAROUBACEAE

- Alvaradoa amorphoides* Liebm. — small deciduous tree; fruits single seeded straight samaras, 1–1.5 cm long, in large pendant dense racemes; leaves very regular pinnate compound with 1–2.5 cm long elongate ovoid alternate leaflets.  
*Picramnia latifolia* Tul. — leaflets tend to be larger, wetter areas.  
\* *Picramnia quaternaria* Donn. Sm. — leaflets tend to be smaller, highly asymmetrical leaflets.  
*Quassia amara* L. — understory riparian shrub (esp. along Río Corobicí) with red tubular flowers (hummingbirds); alate petioles on pinnately compound leaves.  
\* *Simarouba glauca* DC. — deciduous tree; fruits red to purple 2–3 cm long ovals, fleshy, single large pit; leaves compound and very shiny.

## SOLANACEAE

- \* *Capsicum annuum* L. var. *aviculare* (Dierb.) D'Arcy & Eshb. — wild bird's eye chile, shrubby herb to 1.5 m tall, bright orange-red fruit, glabrate leaves with slightly winged petiole.  
□ *Capsicum frutescens* L. — cultivars, sweet and hot peppers, (small cultivated peppers in gardens are domesticated *Capsicum annuum* L.).  
*Cestrum alternifolium* — leaves evenly puberulent beneath, no teeth on anther filaments, corolla lobes 4–6 mm long.  
*Cestrum dumetorum* Schlecht. — leaves with tufts of hairs in vein axils beneath, anther filaments with teeth, corolla 9–11 mm long.  
\* *Cestrum nocturnum* L. — stamens have teeth at the point of insertion.  
*Cestrum scandens* Vahl — no teeth on stamens, corolla lobes 7–9 mm long, corolla greater than 14 mm long.

- \* *Cyphomandra allophylla* (Miers) Hemsl. — anther connectives covering back of anthers, erect herb with inflorescence from a fork in the stem, hairs simple, inflorescence pendant, fruits ovoid green with pale or dark splotches, plant stinks.  
*Jaltmata procumbens* (Cav.) J. L. Gentry — fruit calyx of 5 spreading broadly deltoid teeth below the black berry, berry more than 8 mm across.
- \* *Lycianthes lenta* (Cav.) Bitter — vine or shrub with petals spread but fused.
- *Lycopersicon esculentum* Mill. — commercial tomato, flowers yellow, mostly 7-parted, anthers with sterile tips.
- \* *Melanathus guatemalensis* (Benth.) Solereder — herb similar to *Schwenckia*, but unbranched raceme, fruit with one large (1 mm diameter) seed.  
*Physalis* aff. *angulata* L. — 10 weak ribs on balloon fruit wall.
- \* *Physalis ignota* Britton — plant minutely pubescent all over, leaves mostly greater than 2 cm long, flowers in calyx greater than 2 mm across, 5 strong ribs on balloon fruit wall.
- \* *Physalis lagascae* R. & S. — minute prickles or hair bases on calyx ribs, 10 ribs on balloon fruit wall.
- \* *Physalis minuta* Griggs — leaves mostly less than 2 cm long, flowers in calyx less than 2 mm across, sea shore species, stems glabrous, 5 strong ribs on balloon fruit wall.  
*Physalis nicandroides* var. *attenuata* Waterfall — 5 strong ribs on balloon fruit wall, fruits shaggy.
- \* *Physalis pubescens* L. — stem and leaves glandular pubescent, some hairs especially those low on stem greater than 1 mm long, 5 strong ribs.
- \* *Schwenckia americana* L. — delicate herb, narrow, long, tubular flowers, many-seeded fruits.
- \* *Solanum accrescens* Standl. and Mort. — herbaceous shrub with large leaves rusty tomentose beneath; spines on stem, petiole, and midrib below.
- \* *Solanum americanum* Mill. — no spines, inflorescence sub-umbellate arising from side of stem.  
*Solanum antillarum* O. E. Schulz — inflorescence opposite a leaf, flowers in raceme, dry yellowish, fruits often flatten in press, pedicels thick, no hair on flowering calyx.
- \* *Solanum campechiense* L. — lobed leaves, many straight spines, calyx with stout spines.  
*Solanum deflexum* Greenm. — flowers white, plants with coarse straight hairs.  
*Solanum flavescens* Dun. — lobed leaves, straight spines, stem stalked-stellate pubescent, leaves stellate tomentose beneath, fruits pubescent.
- \* *Solanum hazenii* Britt. — no spines, stem glabrous pubescent, to 3 m tall, flowers white, inflorescence held erect on long peduncle, leaves oval on long petiole and stellate tomentose beneath, calyx has cupule.  
*Solanum hirtum* Vahl — fruits pubescent, leaf base truncate or cordate.  
*Solanum nudum* Dunal — flowers dry purplish, fruits dry globose on slender pedicels, white hairs on flowering calyx, no stellate hairs, usually at higher elevation.

- \* *Solanum ochraceo-ferrugineum* (Dun.) Fern. — spines slightly curved, leaves lobed, stellate pubescent, hairs of calyx and pedicels eglandular.
- \* *Solanum schlechtendalianum* Walp. — no spines, stem and lower surface of leaves short, densely stellate pubescent, leaves unlobed, leaves very different shades of color on each side.  
*Solanum torvum* Sw. X *S. ochraceo-ferrugineum* (Dun.) Fern. — spines, leaves lobed, stellate pubescence, hairs of calyx and pedicels with few glands.

## STERCULIACEAE

- \* *Ayenia dentata* Brand. — narrow, strongly toothed leaves, 4-part sea urchin fruit.
- \* *Ayenia micrantha* Standely — large roundish leaves, 4-part sea urchin fruit, 1–2 cm diameter.
- \* *Byttneria* (= *Beuttneria*) *aculeata* Jacq. — scandent shrub with green to yellow recurved hooks on hollow stems; fruits spherical with multiple long thin spines on them.
- \* *Byttneria catalpaefolia* Jacq. — scandent unarmed shrub with highly variable large size leaf, lanceolate to cordate.
- \* *Guazuma ulmifolia* Lam. (= *G. tomentosa* HBK.) — bushy tree with tiny yellow-white flowers; ripe fruits woody indehiscent 1.5 × 2 cm diameter globular with bumpy black surface, filled with columns of small gray glabrous seeds 2–3 mm in diameter.
- \* *Helicteles guazumaefolia* HBK. — shrub to treelet to 3 m tall, red flowers, twisted multi-ribbed hard fruit 1 to 1.5" long, scattered on forest edges.
- \* *Helicteres baruensis* Jacq. — shrub to treelet to 4 m tall, yellow-green flowers, twisted multi-ribbed hard fruit 1.5 to 3" long on a long petiole, common in riparian disturbed sites at SRNP.
- \* *Melochia nodiflora* Sw. — tight balls of fruits in axils, short and fat leaves.
- \* *Melochia pyramidalata* L. — small 5-lobed papery fruits.
- \* *Melochia villosa* (Mill.) Fawc. and Rendl. (= *Melochia hirsuta* Cav.) — apical hairy inflorescences, elongate leaves.
- \* *Sterculia apetala* (Jacq.) Karst. — large deciduous tree; flowers 1 cm diameter yellow and purple below; fruits dehiscent with non-urticating irritating hairs inside; seeds oval, soft, black, 2 cm long.
- \* *Waltheria glomerata* Presl. — shrub, with large leaves, cluster of inflorescences on node, pubescence shorter.
- \* *Waltheria indica* L. (= *Waltheria americana* L.) — pubescence longer.

## STYRACACEAE

*Styrax argentea* Presl. — tree with medium large oval leaves and pilose petioles, flowers with cup at base, in elongate clusters among leaves.



## THEACEAE

*Pelluciera rhizophorae* Tr. and Pl. — tree with large heart-shaped fruits, attached by the base with sharp tip, mangrove, very broad clustered buttresses.

## THEOPHRASTACEAE

- \* *Jacquinia pungens* Gray (= *Jacquinia aurantiaca* Aiton, = *Jacquinia macrocarpa* Cav.) — shrub with red flowers, stiff leaves with sharp spine at tip, leafless in much of rainy season.

## TILIACEAE

- \* *Apeiba tibourbou* Aubl. — deciduous small tree; flowers yellow; indehiscent fruit like sea urchins 5–10 cm diameter; seeds small in a heavy wad in the fruit.  
*Corchorus orinocensis* HBK. — herb, yellow flowers, 3-valve pod, large to small leaves.
- \* *Corchorus siliquosus* L. — herb, small leaves, 2-valve pod.
- \* *Luehea candida* (T. C.) Mart. — deciduous tree with large white flowers in first weeks of rainy season; fruit 6–10 cm long, woody, dehiscent, seeds winged, with 5 heavy ridges along the sides.  
*Luehea seemannii* Tr. and Pl. — deciduous tree with 2 cm long ridged woody dehiscent fruits.
- \* *Luehea speciosa* Willd. — deciduous tree with large white flowers in last weeks of the rainy season; dehiscent woody fruit 4 cm long, smooth without ridges; mature leaves dark shiny green on top, pale below.
- o Note: *Luehea candicans* Mart. is a South American species.
- \* *Triumfetta bogotensis* DC. — bigger fewer fruits and flowers, fruit scattered along infrutescence.
- \* *Triumfetta lappula* L. — fruits and flowers smaller in big cluster near ends of infrutescences.

## TRIGONIACEAE

- \* *Trigonia rugosa* Benth. (= *Trigonia floribunda* Oerst.) — vine, woody, fruits capsules, silvery underside of leaves, big clusters of branch end small flowers.

## TURNERACEAE

- \* *Erblichia odorata* Seem. — yellow-flowered tree, willow-like leaves, crenulate leaf-margins; fruit a 3 cm long 4-valved woody pointed oval.
- \* *Piriqueta cistoides* (L.) Mey - herb, elongate narrow leaves, flower 1 cm pediculate.

- \* *Turnera diffusa* Willd. — small leaves, tighter inflorescence, yellow flowers, densely pubescent leaves with strongly lobed margins.
- \* *Turnera punilea* L. — strongly toothed leaves, hairy clusters of flowers.
- \* *Turnera ulmifolia* L. — the common one with yellow large single flowers, roadside.
- o *Turnera angustifolia* Mill.

#### TYPHACEAE

*Typha latifolia* L. — marsh cattail, common in the Río Tempisque delta marshes (if you are a splitter, this might be *Typha domingensis* Persoon).

#### ULMACEAE

- Celtis iguanae* (Jacq.) Sarg. — tree with strongly recurved hooks on branches.
- \* *Trema micrantha* (L.) Blume — rare riparian small tree with 2-3 mm diameter red shiny juicy fruits in clusters at nodes on lateral branches.

#### URTICACEAE

- Laportea aestuans* (L.) Chew. — alternate large toothed leaves, very large spray inflorescence.
- Myriocarpa longipes* Liebm. — tall shrub, long thin bunches of flowers spikes.
- Phenax sonneratti* (Poir) Weddell — herb, tight brown 3 mm diameter inflorescences in axils, delicate plant, alternate leaves.
- \* *Pilea microphylla* (L.) Liebm. — minute leaves, small herb.
  - Pouzolzia guatemalana* (Blume) Weed. — entire leaves, clusters of flowers at nodes.
  - \* *Urera baccifera* (L.) Gaud. — leaves with large teeth, slightly stinging, very large leaves.
  - Urera elata* (Sw.) Griseb. (= *Urera egersii* Hieron) — smaller teeth on leaves, oval large leaves, no spines.

#### VERBENACEAE

- Aegiphila deppeana* Staud.
- \* *Aegiphila martinicensis* Jacq. (= *Aegiphila laxicapulis* Mold. = *Aegiphila panamensis* Mold. = *Aegiphila glandulifera* Mold.) — shrub with sprays of yellow flowers, small eucalyptus-like woody fruits when dry.
  - \* *Avicennia germinans* (L.) L. (= *A. nitida* Jacq.) — black mangrove; single seeded fruits flat with grooves down side, about 2 cm long, sprout immediately; leaves heavily encrusted with salt on one side in dry season; dense pneumatophores around base of tree.

- \* *Bouchea prismatica* (Jacq.) Juntze — very strongly toothed leaves, shrub.
- \* *Clerodendron pittieri* Moldenke — shrub on edges of mangroves.
- \* *Cornutia grandifolia* (Schlecht. and Cham.) Schau. — small tree with big terminal sprays of blue flowers.
- \* *Lantana camara* L. — orange and yellow flowers, shrub, spiny.
- \* o *Lantana glandulosissima* Hayek — believed to be a separate species because it has glandular pubescence, but otherwise identical to *L. camara*.
- \* *Lippia alba* (Mill.) N. W. Brown — yellow and lavender flowers, stiff herb, roadside.
- \* *Lippia cardiostegia* Benth. — large leaves.
- \* *Lippia controversa* Moldenke — very large rough leaves, 3 cm peduncles of inflorescence.
- o *Lippia graveolens* HBK. — RCM.
- o *Lippia oxyphyllaria* (D. Sm.) Standl. — a misidentification for *L. controversa*.
- \* *Petrea volubilis* L. — woody vine with lavender purple flowers in long sprays.
- \* *Phyla nodiflora* (L.) Mold. [= *Lippia nodiflora* (L.) Mich.] — herb, inflorescences look like short *Plantago* inflorescences, moist areas, leaves dentate at spatulate end.
- \* *Phyla strigulosa* (Mart. and Gal.) Mold. — more upright herb, axillary inflorescences on long pedicels.
- \* *Priva lappulacea* (L.) Pers. — herb with spheroidal fruits, sticktight fruits.
- \* *Rehdera trinervis* (Blake) Mold. — tree with 1.5–2 cm little eggplant fruits.
- \* *Stachytarpheta cayennensis* (L. Rich.) Vahl — north of La Cruz, thinner inflorescence.
- \* *Stachytarpheta jamaicensis* (L.) Vahl [= *S. mutabilis* (Jacq.) Vahl, = *S. frantzii* Polak] — herb with dark blue flowers.
- o *Tectona grandis* L. — planted in fence rows.

## VIOLACEAE

- \* *Hybanthus attenuatus* (H. & B.) G. K. Schulze — one long cream-colored petal, flimsy herb.
- \* *Hybanthus oppositifolius* (L.) Taub. — as *H. attenuatus* but with narrower leaves.

## VITACEAE

- \* *Cissus rhombifolia* Vahl — trifoliolate leaf vine, black-purple 1 cm diameter juicy fruits.
- \* *Cissus sicyoides* L. — monofoliolate leaf vine.
- o *Vitis tiliifolia* H. & B. ex Roem. and Schult. — commercial grape.

## ZINGIBERACEAE

- o *Hedychium coronarium* Koenig — herb with white flowers.

## ZYGOPHYLLACEAE

- \* *Guaicum sanctum* L. – small tree with compound leaves ending in an asymmetrical point; small flowers sky blue; fruits juicy orange glabrous; wood extremely hard, heartwood turns blue on exposure to air.
- \* *Kallstroemia maxima* (L.) Hook. and Arn. [= *Kallstroemia pubescens* (G. Don.) Dand.] – herbaceous weedy vine, pinnately compound leaf without a terminal leaflet.