



## Leaf anatomy of medicinal shrubs and trees from gallery forests (Paranaense province) Argentina

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### INTRODUCTION

Gallery forests are situated on the margins of Paraná and Uruguay rivers and Delta of the Paraná river, reaching Punta Lara city on the right margin of Río de la Plata (Cabrera 1976). This region has a big quantity of native medicinal plants (Amat and Yajía 1991). Recently, there has been a remarkable revival in the use of herbal medicines. In this way, before to commercialize these medicinal plants, it would be interesting to have a tool to identify the entire or fragmented material. Some studies of leaf anatomy of trees have been carried out (eg Cortadi *et al.* 1996; Guantay 2004; Wagner and Ponessa 2004), however, is useful to increase the knowledge of leaf anatomy in a bigger number of species. Therefore, we studied leaf epidermis and leaf structure of 62 species belonging to 28 families. Our purpose was to get micromorphological characters useful to distinguish the studied taxa from disgregated leaf material.

### MATERIAL AND METHODS

Fully developed leaves of fresh and hydrated and fixed in FAA herbarium specimens (ERA, LP, LPAG, and SI) were surveyed. Conventional techniques were used to make semipermanent slides and to analyze epidermis and internal leaves structures (D'Ambrogio de Argüeso 1986). Epidermal cell wall patterns, stomata and trichome types, and stomatal index were recorded. Midvein transection shapes, mesophyll structure, crystal types, secretory structures, mechanical and vascular tissues, their presence and distribution were registered. Original illustrations were drawn by means of a camera lucida, and they were completed using Metcalfe and Chalk's (1950) symbols. For terminology Metcalfe and Chalk (1950) were followed.

### EXSICCATA AND ETHNOBOTANY

*Casearia sylvestris* (Flacourtiaceae). Corrientes, 8-VIII-1973, A. Schinini, S.G. Tressius & B. Benítez 6905 (LP). Leaves and bark: antiinflammatory,

cicatrizant, febrifugal (Toursarkissian 1980). *External use*: vulnerary, insect repellent, antidote of bite viper, antidiarrheic, depurative, antirheumatic (Paz *et al.* 1992).

*Inga verna* subsp. *affinis* (Fabaceae). Misiones, Parque Nacional Iguazú, 12-XI-1969, I.R. Volkart s.n. (LPAG); Cataratas de Iguazú, 15-XI-1971, M.J. Dimitri s.n. (LPAG). *Leaves and bark*: astringent, expectorant antineuralgic, antiseptic (Lahitte *et al.* 1998, 1999). *Resin of fruits*: analgesic (Toursarkissian 1980).

*Nectandra angustifolia* (Lauraceae). Entre Ríos, Concordia, 12-X-1968, A.L. Cabrera & A. Sagastegui 19331 (LP). *Bark*: purgative (Toursarkissian 1980); digestive (Martinez Crovetto 1981).

*Pavonia sepium* subsp. *sepium* (Malvaceae). Buenos Aires, Pereyra, 24-III-1966, J. Amorín s.n. (LPAG). *Leaves*: emollient, pectoral (Toursarkissian 1980).

### RESULTS AND DISCUSSION

Epidermal features and leaf anatomy show significant differences within the studied taxa that allow us to elaborate a key to distinguish them. Some of the main differential traits are: (1) presence of multilayered epidermis and cystoliths in *Ficus luschnathiana* (Miq.) Miq.; (2) presence of hypodermis [eg *Myrceugenia glaucescens* (Cambes.) D. Legrand & Kausel]; (3) stomata and trichome types (eg cyclocytic and pilose nest in *Baccharis* spp.); (4) midvein transection outlines [eg midvein convex and keel-shaped on the adaxial side in *Allophylus edulis* (A. St.-Hil. A. Juss. & Cambess.) Radlk.]; (5) mesophyll types [eg undifferentiated in *Poiretia tetraphylla* (Poir.) Burkart]; (6) presence and secretory structures types [eg large secretory cavities in Malvaceae (Fig. 1A-D), secretory cells in Lauraceae (Fig. 1E-G)]; (7) presence and crystal types [eg solitary, macles and druses in *Casearia sylvestris* Sw. (Fig. 1H-K)]; (8) presence of idioblastic sclereids [eg *Inga verna* Willd. subsp. *affinis* (DC.) T.D. Penn. (Fig. 1L-O)]. Some characters have been previously reported by different authors. Our results are in agreement with them (eg Metcalfe and Chalk 1950, 1979, 1983).

**CONCLUSIONS**

Epidermal and leaf microcharacters have diagnostic value to identify species from disaggregated material.

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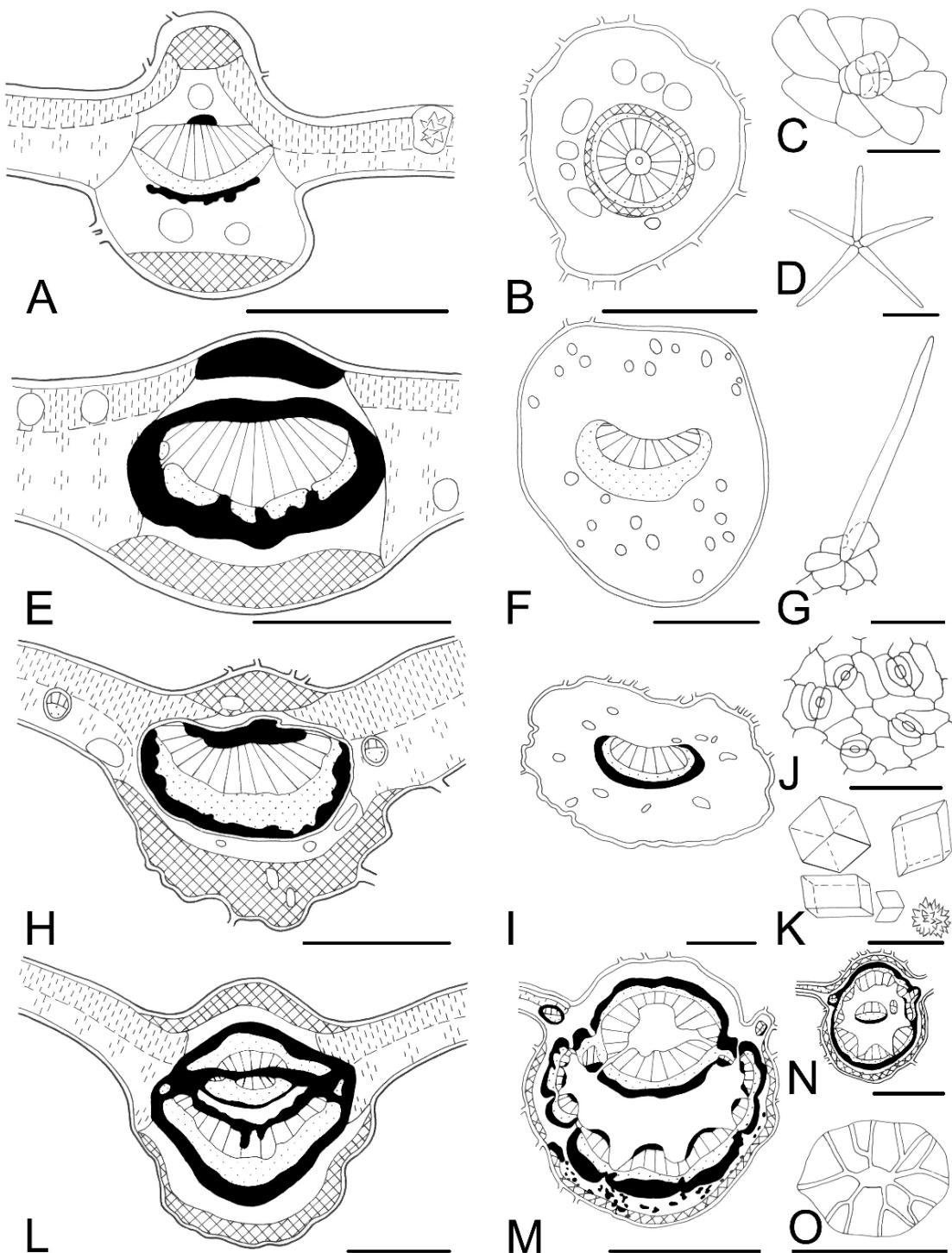


Figure 1. Leaf characteristics in transection and surface view. A-D: *Pavonia sepium* A. St.-Hil. subsp. *sepium*. A, midvein and mesophyll with an idioblastic druse; B, petiole with large mucilage secretory cavities; C, glandular trichome with multicellular head; D, stellate trichome. E-G: *Nectandra angustifolia* (Schrad.) Nees & Mart. ex Nees. E, midvein, shows a ring of sclerenchyma and lignified adaxial collenchyma; F, petiole with secretory tissue; G, non-glandular trichome. H-K: *Casearia sylvestris* Sw. H, midvein, shows xylematic and phloematic fibres; I, petiole with secretory tissue; J, paracytic stomata on abaxial epidermis; K, crystals of different types and size. L-O: *Inga verna* Willd. subsp. *affinis* (DC.) TD Penn. L, midvein, shows a complicated distribution of vascular tissue; M, petiole with petreal cells in the cortex; N, rachis, similar to petiole; O, detail of an idioblastic sclereid (petreal cell). Bars: A, E, H, L = 300 µm; D = 200 µm; B, F, I = 500; C, G, J, O = 50 µm; K = 25 µm; M, N = 1000 µm