The Family Life of Plants: Visual Key

Alexey Shipunov

On the cover: Haptanthus hazlettii (Buxaceae, boxwood family) from Atlantida province, Honduras.

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Foreword

How to know plant families? This book (or, better to say, atlas) tries to help it.

Why to learn plant families? If the goal is to know plants, plant families are extremely important. There are roughly 300,000 species of plants but only several hundred families. Consequently, knowledge of families simplify determination thousand times. Families are also natural units of plant diversity which mean that one can estimate many features on all or on majority of same family members.

Which families are here? Only those families which are important worldwide. Most frequent families come first.

What is not covered? Many small families of flowering plants, and (at the moment) most of spore plants and gymnosperms.

How to learn with this book? The best way is just go through photographs of one family and try to understand what they all have in common. Then check the description (if available) to compare. Then compare with neighbor families and understand how they are actually different. Then open at random page and (without looking at the top of page) guess which family is it, or do other exercises (if available).

This work is under development, therefore please check for the updates. Version date is located on the second page.
Chapter 1

Three which conquered the Earth

1.1 Compositae

Compositae, or Asteraceae (two alternative names)—Aster family. Herbs/woody, sometimes with milky sap. Leaves variable, typically alternate/opposite, without stipules. Inflorescence an involu-crate head resembling the sole flower. Flowers unisexual/bisexual, actinomorphic/zygomorphic. Calyx reduced to pappus/scales/rarely completely absent, petals C\(5\) or \(3,2\) or \(3\). Stamens A\(5\), anthers united into a tube around the style. Fruit small, solid and dry (cypsela), usually with long hairs on the top (pappus). Widespread.
1.2 Leguminosae

Alternative name is **Fabaceae**. Also, in the literature some groups (like Mimosaceae and Caesalpiniae) are sometimes separated from Leguminosae. The legumes. Trees, shrubs, herbs, or vines, often bearing root nodules that harbor nitrogen-fixing bacteria. The leaves are usually alternate and mostly pinnately once or twice compound, or less often palmately compound or trifoliolate, or seldom unifoliolate or simple; the petiole and the individual leaflets commonly each have a basal pulvinus that may govern their orientation; stipules are usually present, sometimes modified into spines. The flowers are mostly borne in indeterminate (racemose) inflorescences; they are hypogynous to somewhat perigynous, and usually perfect. The sepals are distinct or connate into a lobed tube that is often 2-lipped, or seldom the calyx is strongly reduced or virtually obsolete. The petals are distinct (and often highly differentiated from one another) or connate into a lobed tube, or the 2 lower ones are connate and the others distinct; rarely there are no petals. The stamens most commonly number 10, less often 9, sometimes fewer or more numerous; very often they are joined by their filaments to form a closed or open sheath around the ovary. The flower has a single pistil (very rarely 2 or more pistils) composed of a single carpel with a terminal style and stigma. The fruit is commonly dry and dehiscent along both sutures (a typical legume), but sometimes it is indehiscent or breaks transversely into 1-seeded joints. The seeds typically have a very hard seed coat and are often very long-lived; they have a large embryo with 2 cotyledons, and usually little or no endosperm.
1.3 Gramineae and other graminoids

1.3.1 Gramineae

Gramineae, or Poaceae (two alternative names)—Grass family. Herbs/bamboos. Leaves narrow, linear, alternate in 2 ranks, with sheath and ligules; stems terete in section, internodes usually hollow. Flowers each compressed between a bract (lemma) and bracteole (palea, rarely absent), the unit forming a floret, these arranged in 2 ranks in spikelets subtended by 2/rarely 1 empty bracts (glumes); spikelets themselves grouped in more complex inflorescences, usually spikes/racemes, or panicles. Perianth represented by 2–3 scale-like lodicules (often very small), stamens $A_3$ or $2$. Seed fused to pericarp to form a one-seed dry fruit caryopsis. Widespread.
1.3.2 Cyperaceae

Herbs, sometimes large. Stems terete / 3-angled in section, usually solid. Leaves spirally arranged, with closed sheaths, ptyxis conduplicate. Flowers subtended by membranous bracts, spiral / in 2 ranks in spikes / spikelets, without empty glumes at the base, unisexual or bisexual. P scales / bristle-like hairs, A 6 / rarely 3, G 1-celled, superior / naked, sometimes surrounded by a flask-shaped structure (utricle: sedges, *Carex*); styles 2–3; ovule 1, basal. Fruit nut-like. Widespread.
1.3.3 Juncaceae

Herbs, often rhizomatous. Stems terete in section. Leaves usually basal, spirally arranged, sometimes reduced to sheaths. Flowers in inflorescences, usually bisexual, actinomorphic. P 6, A usually 6, pollen in tetrads, G(3), superior; ovules 3 to many. Fruit capsule. Widespread.
1.3.4 Typhaceae

Marsh herbs. Leaves narrow, alternate. Inflorescence of unisexual, dense heads or spikes. Perianth segments thread-like or scales, A 2–5, G 1-celled; ovule 1, apical. Fruit dry or drupe-like. Widespread.
1.4 Mixtures

1.4.1 Mixture 1: Compositae, Leguminosae, Gramineae
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Magnificent Seven

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Labiatae, in a really broad sense
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Labiatae, in a really broad sense
2.3 Rubiaceae
Rubiaceae
Rubiaceae
2.4 Malvaceae
Malvaceae
2.5 Rosaceae
2.6 Umbelliferae
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Cruciferae
Cruciferae
Cruciferae
Chapter 3

Twelve Good

3.1 Euphorbiaceae and allies
Euphorbiaceae and allies
3.2 Solanaceae
3.3 Amaranthaceae
Amaranthaceae
3.4 Araceae
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Moraceae

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And some more, great and small

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Begoniaceae
4.3 Bromeliaceae
4.4 Campanulaceae
4.5 Caryophyllaceae
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4.7 Iridaceae
4.8 “Lilies”

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