

## Laboratory 21: “Commelinoid” Monocots

Continuing with the monocots, we examine 4 new orders today, the Arecales, Commelinales, Zingiberales, and Poales (which we will focus on more in the next lab on the Graminoid Monocots). You only need to know Commelinales and Zingiberales to the Order level, whereas Arecaceae and Bromeliaceae we are learning to the family level.

### **Arecaceae (Palmae) – Palm Family**

**Trees usually with unbranched trunks;** leaves large, at top of trunk, **petioles sheathing**, blade splits into divisions, palmate or pinnate, blade is plicate (folded like a fan); inflorescence highly branched with **numerous small flowers**, with bracts persistent or deciduous; bisexual or unisexual, monoecious or dioecious; flowers 3 merous, usually 6 tepals; ovary superior; of 3 carpels that may be either free or fused; fruit a drupe or rarely a berry.

**Brahea**

**Chamaedorea**

**Phoenix**

### **Order Commelinales**

Herbs; leaves with a **closed basal sheath**, some with a purple hue, some floating aquatics with spongy, expanded stems; inflorescence typically a helicoid cyme; flowers generally bisexual and bilateral, sometimes radial; perianth either 3 sepals and 3 petals (Commelinaceae) or 6 tepals (rarely 4); stamens 6, in two series; ovary superior, 3 fused carpels; fruit a capsule.

**Commelina, Rhoeo, Zebrina** - Commelinaceae (Spiderwort Family)

**Anigozanthos** - Haemodoraceae (Bloodwort Family)

**Eichhornia** - Pontederiaceae (Water Hyacinth Family)

### **Order Zingiberales**

Large herbs, often with a thick stem, vessels limited to roots; leaves usually 2-ranked (sometimes spiral), large, **petiolate, with pinnate transverse venation, rolled into a tube in bud**; flowers, **zygomorphic or asymmetric**; **inflorescence showy**; **stamens usually reduced to 1 with showy staminodes present** (5 stamens in Musaceae and Heliconiaceae); nectaries usually present on the ovary; stigma 1, funnel-shaped; **ovary inferior**; fruit a capsule or berry.

**Musa** - Musaceae (Banana Family)

**Heliconia** - Heliconiaceae (Heliconia Family)

**Zingiber** - Zingiberaceae (Ginger Family)

**Calathea, Maranta** - Marantaceae (Prayer Plant Family)

**Canna** - Cannaceae (Canna Family)

**Bromeliaceae – Pineapple Family**

Epiphytic or terrestrial herbs; **leaves stiff, often spiny with colored bases usually concave**, often forming a basal rosette, some modified for water storage; **specialized peltate trichomes present, water-absorbing**; flowers 3-merous, bisexual, regular, calyx often green and corolla often showy, subtended by a bract; stamens 6, often attached to base of the perianth; ovary superior or inferior, composed of 3 fused carpels; one style with 3 stigmas, **stigmas spirally twisted**; fruit a berry or a capsule.

Tillandsia

Ananas

Puya

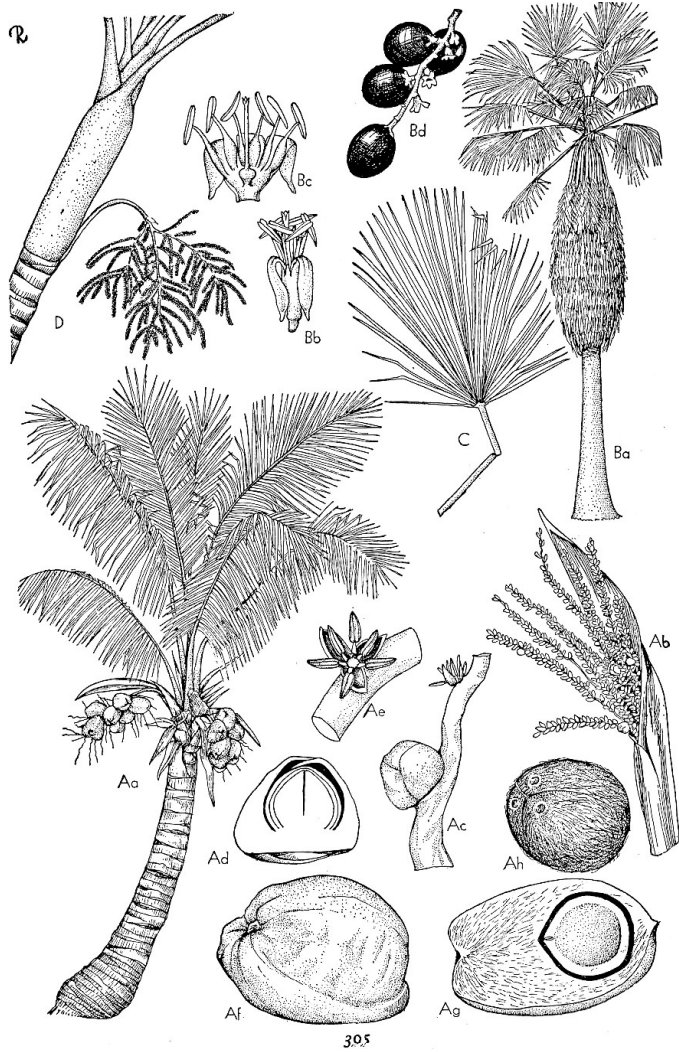


Fig. 77. PALMAE. A. *Cocos nucifera*: Aa, tree in fruit, much reduced; Ab, flowering inflorescence and spathes,  $\times \frac{1}{10}$ ; Ac, section of rachilla with pistillate and staminate flower,  $\times \frac{1}{2}$ ; Ad, pistillate flower, vertical section,  $\times 1$ ; Ae, staminate flower,  $\times 1$ ; Af, fruit,  $\times \frac{1}{8}$ ; Ag, same, longitudinal section,  $\times \frac{1}{8}$ ; Ah, nut,  $\times \frac{1}{8}$ . B. *Washingtonia filifera*: Ba, tree, much reduced; Bb, flower,  $\times 2$ ; Bc, same, perianth expanded,  $\times 2$ ; Bd, fruit,  $\times 1$ . C. *Thrinax microcarpa*: leaf, much reduced. D. *Chrysalidocarpus lutescens*: trunk apex showing flowering inflorescence, crownshaft and leaf-petioles, much reduced. (After L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949.)

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COMMELINACEAE. SPIDERWORT FAMILY

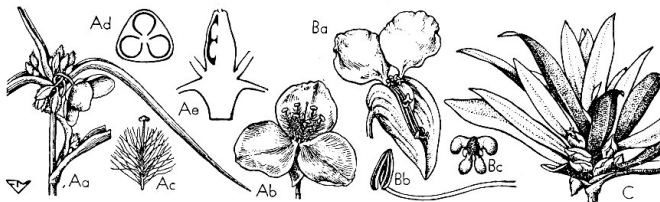


Fig. 85. COMMELINACEAE. A. *Tradescantia virginiana*: Aa, inflorescence,  $\times \frac{1}{4}$ ; Ab, flower,  $\times \frac{1}{2}$ ; Ac, stamen,  $\times 1$ ; Ad, ovary, cross-section,  $\times 5$ ; Ae, ovary, vertical section,  $\times 3$ . B. *Commelina coelestis*: Ba, flower,  $\times 1$ ; Bb, fertile stamen,  $\times 4$ ; Bc, staminodium,  $\times 4$ . C. *Rhoeo discolor*: flowering plant,  $\times \frac{1}{8}$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

PONTERIACEAE. PICKEREL-WEED FAMILY

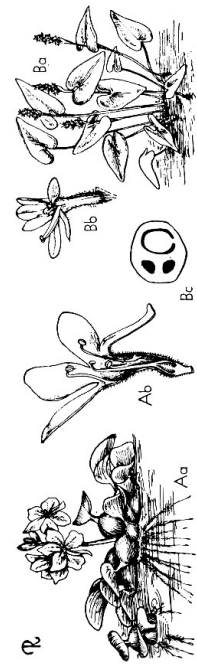


Fig. 86. PONTERIACEAE. A. *Eichhornia crassipes*: Aa, plant in flower,  $\times \frac{1}{16}$ ; Ab, flower, vertical section,  $\times \frac{1}{2}$ ; Ba, *Pontederia cordata*: Ba, plant in flower,  $\times \frac{1}{16}$ ; Bb, flower, vertical section,  $\times \frac{1}{2}$ ; Bc, ovary, cross-section,  $\times 10$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

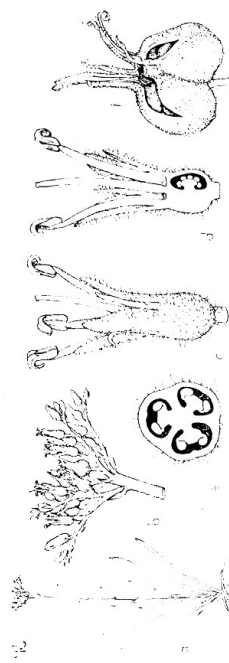


Fig. 89. HAEMODORACEAE. *Lachnanthes tinctoria*: a, plant in flower,  $\times \frac{1}{10}$ ; b, inflorescence,  $\times \frac{1}{2}$ ; c, flower, habit,  $\times 4$ ; d, flower, vertical section,  $\times 4$ ; e, ovary, cross-section,  $\times 4$ ; f, fruit,  $\times 3$ .

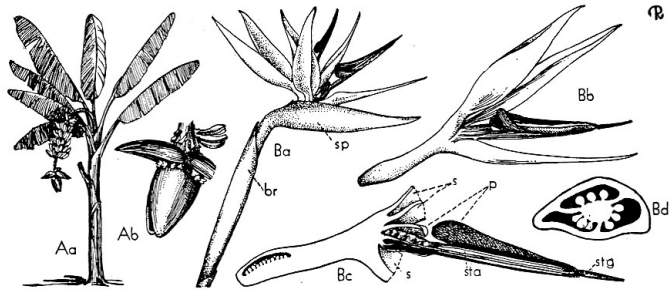


Fig. 93. MUSACEAE. A, *Musa paradisiaca*: Aa, plant in fruit and flower, much reduced; Ab, inflorescence,  $\times \frac{1}{20}$ . B, *Strelitzia Reginae*: Ba, inflorescence,  $\times \frac{1}{6}$  (br bract, p petal, s sepal, sp spathe, sta stamen, stg stigma); Bb, single flower,  $\times \frac{3}{8}$ ; Bc, same, vertical section (sepals partially removed),  $\times \frac{1}{2}$ ; Bd, ovary, cross-section,  $\times 2$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

ZINGIBERACEAE. GINGER FAMILY 34

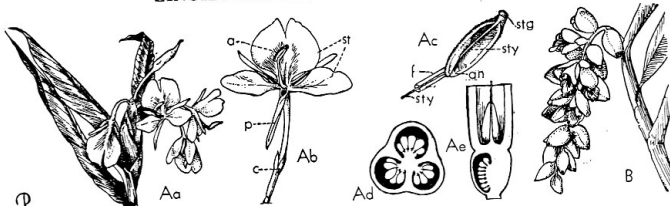
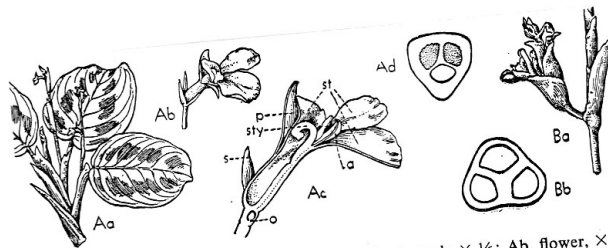


Fig. 94. ZINGIBERACEAE. A, *Hedychium coronarium*: Aa, flowering stem,  $\times \frac{1}{6}$ ; Ab, flower habit (c calyx, p petal, st staminodia, a stamen, sty style and stigma),  $\times \frac{1}{4}$ ; Ac, anther and stigma (f filament, sty style, an anther-cell, stg stigma),  $\times 1$ ; Ad, ovary, cross-section,  $\times 3$ ; Ae, ovary, vertical section,  $\times 2$ . B, *Alpinia speciosa*: inflorescence,  $\times \frac{1}{6}$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)



MARANTACEAE. A, *Maranta bicolor*: Aa, flowering branch,  $\times \frac{1}{6}$ ; Ab, flower,  $\times 1$ ; Ac, vertical section (o ovary, s sepal, p petal, st staminodes, a anther, sty style),  $\times 15$ ; Ad, ovary, cross-section,  $\times 15$ . B, *Calathea Lietzei*: Ba, inflorescence,  $\times \frac{1}{2}$ ; Bb, l, ovary, cross-section,  $\times 15$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

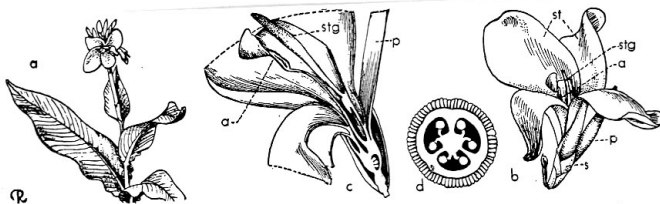


Fig. 95. CANNACEAE. *Canna generalis*: a, flowering plant, much reduced; b, flower (s sepal, p petal, a anther, stg stigma, st staminodia),  $\times \frac{1}{4}$ ; c, flower, vertical section,  $\times \frac{1}{2}$ ; d, ovary, cross-section,  $\times 4$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)

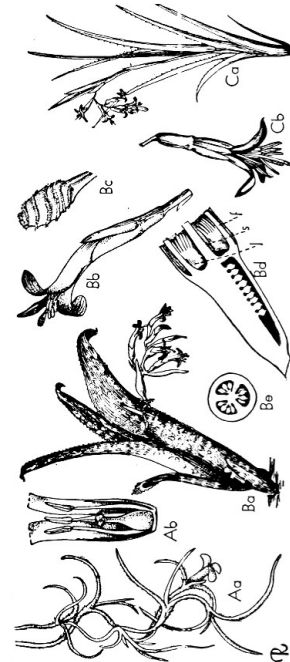


Fig. 84. BROMELIACEAE. A, *Tillandsia usneoides*: Aa, flowering branch,  $\times \frac{1}{2}$ ; Ab, part of a flower,  $\times 2$ . B, *Aechmea polystachya*: Ba, plant in flower,  $\times \frac{1}{10}$ ; Bb, flower,  $\times \frac{1}{2}$ ; Bc, stigma,  $\times 2$ ; Bd, ovary, vertical section,  $\times 1$ ; Be, ovary, cross-section,  $\times \frac{1}{2}$ . C, *Billbergia nutans*: Ca, plant in flower,  $\times \frac{1}{10}$ ; Cb, flower,  $\times \frac{1}{2}$ . (From L. H. Bailey, *Manual of cultivated plants*, The Macmillan Company, 1949. Copyright 1924 and 1949 by Liberty H. Bailey.)