

CYCADACEAE

Lindley, J., Nat. Syst., 2nd ed., p. 312 (1836); Miquel, F., A. W., Monogr. Cycad. (1842), Prodr. Syst. Cycad. (1861); De Candolle, A., Prodr. 16²:522-547 (1868); Regel, E. von, Gartenfl. 25:47-51, 140-144, 202-205, 370-373 (1876); Chamberlain, C. J., The Living Cycads (1919); Pilger, R., Cycadaceae in Engler and Prantl's Natürl. Pflanzenf., 2nd ed., 13:44-82 (1926); Schuster, R., Cycadaceae in Das Pflanzenreich 4¹:1-168 (1932).

Woody plants, commonly tree-like. Stem stout, aerial and columnar or subterranean and tuberous, unbranched or sometimes slightly branched; with a large pith, scanty zone of wood, and large cortex. Leaves relatively large, ^{coriaceous,} borne in alternating series with short, ~~unicompound~~, ovate to subulate scales (cataphylls) acting as bud scales; pinnate or, in Bowenia, bipinnate; generally borne in a crown at the apex of the stem; developed in spiral succession from an apical meristem, except in Bowenia. Leaflets with only "parallel" (dichotomous) venation, except in Cycas and Stangeria, which have a midrib; in Cycas with no veins except the midrib and in Stangeria with a midrib and lateral veins extending at right angles to it.

Strictly dioecious plants with all sporophylls arranged spirally and in more or less compact cones, except the megasporophylls of Cycas, which form a loose crown. Cones borne singly or in small groups at or very near the apex of the stem, relatively large, most commonly ovoid or cylindric. Microsporophylls (stamens) scale-like and flat, or peltate, with a sterile tip, the lower surface bearing numerous microsporangia ^{usually grouped} in sori of 2-6. Megasporophylls (carpels) either scale-like, flat, and narrowed to a point, or more or less peltate and stalked; with 2-10 marginal ovules in Cycas and 2 suspended ovules in the other genera. Ovules sessile, but in Dioon

and occasionally in Bowenia some appearing stalked because portions of the sporophyll are drawn out during growth of the ovules and cone. Fertilization by multiciliate sperms. Seeds large; globose, ovoid, or oblong; the outermost layer of the integument fleshy and usually colored, the middle layer crustaceous or bony; endosperm abundant; embryo with 2 cotyledons or, in Ceratozamia, with only 1.

The nine genera are so well marked that they may be recognized without difficulty.

Key to the Genera

- I. Leaflets with a midrib but without side veins; megasporophylls in a loose crown, long, flat, with 2-10 marginal ovules 1. Cycas
- II. Leaflets with a midrib and side veins; megasporophylls in a compact cone, peltate, with 2 suspended ovules 2. Stangeria
- III. Leaflets without a midrib, veins parallel; megasporophylls in a loose or compact cone, peltate, with 2 suspended ovules
 - A. Leaflets not articulated with the rachis
 1. Leaflets bipinnate or occasionally tripinnate 3. Bowenia
 2. Leaflets pinnate
 - a) Leaflets broad at base; megasporophylls in a loose cone, very unequally peltate; ovules on stalk-like outgrowths of the megasporophyll 4. Dioon
 - b) Leaflets narrowed at base; megasporophylls in a compact cone, about equally peltate; ovules sessile
 - (1) Leaflets generally with a basal swelling, nearly always entire; sporophylls acuminate, terminating in a median spine 5. Macrozamia
 - (2) Leaflets without a basal swelling; entire, toothed, or lobed; sporophylls obtuse, notched, terminating in a median spine 6. Encephalartos
 - B. Leaflets articulated with the rachis
 1. Leaflets deflexed on the rachis, entire; microsporophylls flat, obtuse; megasporophylls with a thick top and 3 shallow grooves above and below 7. Microcycas
 2. Leaflets not deflexed, entire; sporophylls with a thick top bearing 2 horns 8. Ceratozamia
 3. Leaflets not deflexed, generally toothed; sporophylls with a thick flat top without horns 9. Zamia