GRIMMIACEAE

zi-e xian ke

by Cao Tong, Si He, and Dale H. Vitt

Plants small to rather robust, yellowish green to dark-green, brown or blackish below, in dense cushions or dense to loose tufts. *Stems* erect or prostrate, forked or moderately branched from innovations, sometimes fasciculately branched or shortly tuft-like laterally branched, rhizoids often present at the base; with or without central strand in transverse section. *Leaves* in many rows, imbricate, erect or somewhat contorted to occasionally crisped when dry, erect-spreading to wide-spreading when moist, mostly lanceolate to sometimes narrowly lanceolate, rarely oblong-ovate or ovate, keeled or concave, acute at apex, often muticous or ending in a hyaline hair-point; margins recurved, plane or slightly incurved, often bistratose above; costa strong, single, percurrent, subpercurrent or ending below the leaf apex; upper cells small, rounded-quadrate to irregularly short-rectangular, usually obscure, unistratose or usually bistratose to 3–4-stratose toward the apex, smooth, sometimes papillose, thick-walled, the cell walls sometimes sinuose or nodulose; lower cells near margins subquadrate, quadrate to rectangular, thinner-walled or with transverse walls thicker than the longitudinal ones, juxtacostal cells elongate, with walls straight or often somewhat to strongly sinuose or nodulose. *Autoicous* or dioicous. *Perichaetial leaves* similar to vegetative leaves, but larger, loosely areolate or differentiated with membranous and pallid margins. *Setae* terminal or lateral, straight or arcuate, short or elongate, sometimes shorter than the urn; capsules erect or horizontal to pendent, immersed to long-exserted, obovoid, subglobose to oblong-ovoid or cylindrical, smooth to ribbed; exothecial cells mostly elongate-hexagonal, thin-walled; stomata sometimes present at base of urns; annuli usually present, sometimes absent, consisting of quadrate to shortly rectangular cells with thick walls; opercula conic or convex, with short or long, erect to somewhat oblique beak or without a beak; columella sometimes persistent, not falling with opercula; peristome single, with 16 red-brown to yellowish brown teeth, erect, lanceolate to linear-lanceolate, entire or imperfectly perforate and split above, papillose on both the outer and inner surface, the peristome teeth sometimes reduced or absent. *Calyptrae* small, covering upper portion of urns, sometimes large, covering most of the urns (campanulate), usually mitrate or cucullate, smooth or sometimes plicate. *Spores* small, 7–16 µm in diameter, green to yellowish green, smooth to more or less granulose or papillose.