
Melanthaceae

Melanthaceae Bercht. & J. Presl (1820), nom. cons.

Greyiaceae Hutch. (1926).

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Perennial, rhizomatous herbs (*Francoa*, *Tetilla*), suffrutices (*Melianthus*), woody shrubs or small trees (*Greyia*, *Bersama*). Leaves alternate, persistent or deciduous, glabrous or villous, petiolate, simple or imparipinnate, entire, serrate or lobed; venation palmate or pinnate; leaf bases simple or amplexicaul. Stipules absent or present, if present lateral or median, persistent or caducous. Inflorescences lateral or terminal, simple or compound racemes. Flowers resupinated or not, monosymmetric or polysymmetric, tetramerous or pentamerous, bisexual or functionally unisexual (*Bersama*), sometimes with a prominent mentum (*Melianthus*); perianth glabrous or with glandular multicellular hairs and/or simple unicellular hairs. Sepals 4 or 5, polysymmetric or monosymmetric, less or more prominent than the corolla. Petals 4 or 5, cream, purplish or red, free or connivent with crystalline hairs (*Melianthus*), smaller to larger than the sepals, polysymmetric or monosymmetric; androecium haplostemonous or obdiplostemonous, sometimes with one or more stamens absent, polysymmetric or monosymmetric (*Melianthus*); filaments sometimes basally fused, pubescent or glabrous; anthers tetrasporangiate, usually basifixed, dehiscence latrorse. Gynoecium semi-inferior or slightly sunk in the receptacle, 4–5-locular, placentation axile to basal, with one to numerous anatropous ovules on intrusive placentas; style simple, very short to long; stigma small or commissural (*Francoa*, *Tetilla*). Fruit a papery, tardily dehiscent capsule, or a leathery to woody septicidal or loculicidal capsule. Seeds usually small (< 10 mm) and exarillate or larger (> 10 mm) with a large yellow aril (*Bersama*).

A subtropical to warm-temperate family with five genera and 19 species in South America (Chile) and widespread in sub-Saharan Africa.

VEGETATIVE MORPHOLOGY. The plants in this family are all perennial but variable in habit. Some are rhizomatous rosette herbs (*Francoa*, *Tetilla*),

subshrubs (*Melianthus*), soft-wooded small trees (*Greyia*) or hard-wooded shrubs and small trees (*Bersama*). Large trees are absent. In *Francoa* and *Tetilla*, the aboveground parts are annual whereas the stems of *Melianthus* persist for several years and may grow to a height of 1–3 m, being readily replaced from a persistent underground base.

Stipules are absent in *Francoa*, *Tetilla* and *Greyia*, are large and lateral (paired) in most of *Melianthus*, and are median in *Bersama* and in one species of *Melianthus*. The median stipules of *Bersama* are relatively small, papery and caducous. In *Melianthus major*, they are very large, showy and persistent.

The leaf bases of *Greyia* are often described as sheathing (Dahlgren and Van Wyk 1988) but Steyn (1974a, b) showed that the “sheath” is actually part of the stem, and that it abscises with the leaf bases, which are dilated and partially encircle the nodes. The leaf bases are described as petiolar and sheathing in *Francoa* (Cronquist 1981).

The leaves are alternate. The lamina is variously divided. In *Melianthus* and *Bersama*, they are imparipinnate or occasionally trifoliate. In *Greyia* and *Tetilla*, they are simple, lobed and palmately veined whereas in *Francoa* they are lyrate and pinnately lobed. The large, imparipinnate leaves of *Melianthus* and *Greyia* are very distinctive. In *Melianthus*, the leaf margin is mostly coarsely serrate, and the leaves are soft and short-lived. In *Greyia*, the leaf margin is finely serrate or more commonly entire, and the leaves are quite hard or coriaceous.

VEGETATIVE ANATOMY. The wood anatomy of *Melianthus* was described by Metcalfe and Chalk (1950) and Dlamini (1999), of *Greyia* by Gregory (1998), of *Bersama* by Metcalfe and Chalk (1950) and of *Francoa* and *Tetilla* by Gornall and Al-Shammary (1998). The mature wood has diffuse-porous vessels and lacks well-defined growth-rings. The vessels are mostly solitary or

in multiples of 2–3(–8), and perforation plates are simple. The intervacular pits vary from alternate to scalariform, and are variously shaped. Imperforate tracheary elements range from libriform fibres to tracheids. The rays are multiseriate, homogeneous or heterogeneous.

The nodes of *Francoa* are trilacunar, with five vascular traces (Gornall and Al-Shammary 1998). *Melianthus* shows 5–10 lacunae in the nodes, with as many vascular bundles, whereas *Greyia* has nine lacunae and bundles (Hilger 1978). The association between the number of lacunae and the presence of stipules does not hold for Melianthaceae. The number of vascular bundles in the petioles is very variable, with bundles fusing and branching regularly.

Leaf anatomy of *Melianthus* was described by Metcalfe and Chalk (1950) and Dlamini (1999), of *Greyia* by Steyn (1974a, b) and Gregory (1998), of *Bersama* by Metcalfe and Chalk (1950) and Jackson and Jethwa (1973), and of *Francoa* and *Tetilla* by Gornall and Al-Shammary (1998). The leaves are all dorsiventral, and the cuticle varies from thin in *Greyia* to thick in *Bersama*. The stomata are always anomocytic; in *Francoa* they are equally frequent on both leaf surfaces, in *Bersama* and *Melianthus* they are found only on the abaxial surface, and in *Greyia* they are most common on the abaxial surface. Only *Greyia* has a hypodermis, which is uniseriate and consists of large, thin-walled, closely packed cells. The mesophyll is always differentiated into a palisade of 1–4 layers, and a spongy layer. The spongy mesophyll contains crystals deposited either in idioblasts or in undifferentiated cells, and formed as druses, raphides or crystals, usually orientated parallel to the leaf surface. Venation is generally actinodromous, rarely in *Greyia* palinactidodromous or in *Francoa* craspedodromous. At least in *Greyia* and *Bersama*, the leaf teeth have hydathodes. The leaf indumentum is very variable. *Greyia* has long, multicellular, uniseriate hairs with glandular tips as well as glands with 1–3 stalk cells; *Francoa* has simple, 1–5-celled uniseriate eglandular hairs; *Tetilla* has simple 2–6 cells long, uniseriate glandular hairs (Al-Shammary and Gornall 1994); *Bersama* has glandular hairs with a unicellular stalk and a 1–2-cellular head; and *Melianthus* has stellate hairs with unicellular rays. Fehrenbach and Barthlott (1988) report that *Francoa* has smooth wax-flakes whereas *Greyia* has flake-like crystalloids.

FLORAL AND INFLORESCENCE MORPHOLOGY. The inflorescences are lateral or terminal, and

appear not to have been critically investigated. In *Greyia flanaganii*, the terminal position of the inflorescence is obscured by the rapid growth of the vegetative shoot situated in the uppermost leaf axil, which pushes the inflorescence into a pseudo-lateral position (Steyn et al. 1987). Similarly, the inflorescences in most species of *Melianthus* may be pseudo-lateral (Dlamini 1999).

The flowers are resupinate in *Melianthus*, *Bersama* and *Greyia* but not in *Francoa* and probably neither in *Tetilla* (Ronse Decraene et al. 2001). The flowers of *Francoa* and *Tetilla* are tetramerous, those of the other genera pentamerous (Eichler 1878), although in *Melianthus* reductions to tetramery occur frequently. At anthesis, the flowers of most genera are polysymmetric; in *Melianthus*, the flowers are monosymmetric, with the abaxial side formed by the calyx and androecium, and the adaxial side by the calyx and corolla. The receptacle is massively extended in the adaxial direction in *Melianthus*, forming a large mentum.

The calyx is monosymmetric in *Melianthus* and *Bersama* but polysymmetric in the remaining genera. In *Melianthus*, the sepals are the most showy part of the flower, the adaxial sepals forming a large hood-like structure which encloses at least the androecium and gynoecium and often also the petals (Fig. 89A); the lateral sepals are usually quite small, and the abaxial sepal is saccate in several species. In the remaining genera, the sepals are generally most prominent in the bud stage and, when monosymmetric, then so due to fusion, rather than to differences in sepal size.

The petals are always free but otherwise remarkably divergent among the genera. In *Melianthus* they are monosymmetric. Only four petals are developed to maturity. The fifth, adaxial petal is initiated but at stamen initiation its development is arrested, and in the mature flower no obvious trace of it remains (Ronse Decraene et al. 2001). These four petals are situated on the adaxial side of the mentum, they are basally erect, in the middle connivent by capillinection of crystalline hairs, and apically reflexed towards the adaxial, often saccate sepal. In the remaining genera, the corolla is polysymmetric. In *Tetilla*, two petals are much smaller than the other two, and in some cases altogether lost. The petals of *Francoa*, *Tetilla* and *Greyia* are large and showy, and somewhat smaller in *Bersama*. Petal aestivation is imbricate-ascending in *Francoa*, *Greyia* and *Bersama* whereas it is valvate in *Melianthus* (Ronse Decraene et al. 2001).