Winteraceae

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Evergreen shrublets to small trees, rarely epiphytic (in *Drimys*) or with lignonubers (in *D. piperita*), branching sympodially or monopodially; without perulate (except *Drimys*). Entirely glabrous, rarely with hair-like papillae or with minute uniseriate hairs. Various parts often with reddish tinge. Stipules absent. Leaves spirally arranged, usually petiolate, entire, often finely pellucid dotted, often glaucous beneath; nervation pinnate, secondaries (festooned) brochidodromous, tertiaries reticulate. Inflorescence terminal, intercalary, or axillary; partial inflorescences in the axils of aggregated cataphylls, (compound) dichasia, triads, or single flowers. Flowers small to rather large, white to yellow to red, bisexual or unisexual (in *Drimys*), bisymmetric to actinomorphic, hypogynous. Calyx calyptrate, rupturing at very early stages and then persistent or rupturing upon anthesis and then usually dropping (*Drimys*). Torus low to rather long. Petals 2 to many, entire, free or the outer ones connate and rupturing upon anthesis (in *Zygogynum*). Stamens 3 to many, free; filaments short and thick to long-cylindrical; anthers 4-loculate, rarely 2-loculate (in *Zygogynum*), thecae apical to lateral, opening with longitudinal slits, latero-extrorse; connective often not developed, sometimes apically prolonged (in *Zygogynum*); pollen usually in tetrads. Carpels 1 to many, free or variously united into uni- to pluri-locular ovaries. Styles absent. Stigma 1 per carpel, (sub-)sessile, circular to linear, or 1 per ovary and then cap-shaped (*Takhtajaxia*). Placentas 2, linear, opposite, parallel to the stigma or more ventral, usually each with 1 row of ovules. Ovules 2 to many, bitegmic, crassinucellate, anatropous, descending apotropous. Vestigial floral apex sometimes distinct. Fruit or fruitlet a berry, sometimes very hard because of stone-cells, with or without pulp. Seeds few to ∞, generally obovoid, with straight or curved axis, smooth to pustular; testa dark grey to black, hard, brittle; endosperm copious, oily; embryo very small, usually ovoid and slightly bilobed apically.

Four genera with ca. 65 spp., from the Philippines to Tasmania and New Zealand, S and C America, Madagascar.
VEGETATIVE MORPHOLOGY. The family consists of evergreen shrubs and treelets usually between 1 and 10 m high, the extremes being 10 cm and 13 m. Epiphytic shrublets and scramblers are rare (in Drimys). Lignotubers are only reported for one form of Drimys piperita; subterranean runners and especially suckers are more common. Leaves and bark are aromatic and usually have a sharp, less often a bitter taste. The phyllotaxy is 2/5 spiral and sometimes subverticillate. Leaves often persist several flowering seasons; they are extipulate, entire, usually distinctly petiolate, and often glaucous on the lower surface. Only in Drimys cataphylls protect flowerbuds (and young leaves) for an extended period. Branching is sympodial or monopodial (see: Inflorescence).

VEGETATIVE ANATOMY. Essential oil cells of the ranalian type are present in most parts of the plant, sometimes even in the wood rays (Carlquist 1981). (Nests of) sclereids can be present in all vegetative parts and in all flowerparts, except usually in the stamens; these sclereids vary from isodiametric to elongate or short-armed.

The wood lacks vessels, which is regarded as a primitive condition (e.g. Carlquist 1983). Axial parenchyma ranges from scanty and diffuse to occurring in narrow bands. Rays of Kribs’ heterogeneous Type I. Tracheids with circular bordered pits, sometimes with scalariform pitting on end walls (Zygogynum, Drimys; in Pseudowintera only in wound tissue: Patel 1974). Growth rings in Pseudowintera and in some spp. of Drimys.

Phloem mother cells undergo secondary partitioning. The lack of a sharp differentiation between lateral sieve areas and those in sieve plates is regarded as primitive (Esau and Cheadle 1984). Sieve tube plastids of the S-type in Drimys and Pseudowintera, of the P-type in Drimys and Zygogynum (Behnke and Kiritsis 1983).

Nodal anatomy is 3-trace, trilacunar (Benzing 1967). The vascularisation of the petiole is variable and unstable. In Zygogynum s.l. the bundles may occur in two stories and change from horseshoe-shaped to amphicribal (Bailey and Nast 1944a).

The leaf lamina is dorsiventral and almost always glabrous. Lower epidermis papillate in some species of Drimys. Abaxial cuticle with or without alveolar material with waxy inclusions (Bailey and Nast 1944b). Stomata of the paracytic type, in Takhtajania in majority of the anomocytic type (Bongers 1973); front cavity plugged with alveolar material (Fig. 136), but in Drimys sect. Tasmania and in Takhtajania usually only wax plugs or plugs absent (Vink 1970; Bongers 1973). Mesophyll with or without palisade layers; cell walls thin, or with reticulate thickenings to strongly sclerified; sclerenchymatous idioblasts absent to very frequent; oil cells scarce to very frequent; calcium oxalate crystals often present; veins and terminal veinlets with or without sclerenchymatous sheaths.

An indumentum of short uniseriate hairs is only present in Pseudowintera colorata and P. traversii, on very young leaves – especially on the margin – and in the floral region. Zygogynum amplexicaule has tiny hair-like papillae on the inflorescence axes.

INFLORESCENCE. In Zygogynum the apex of the flowering twig bears densely crowded cataphylls.