

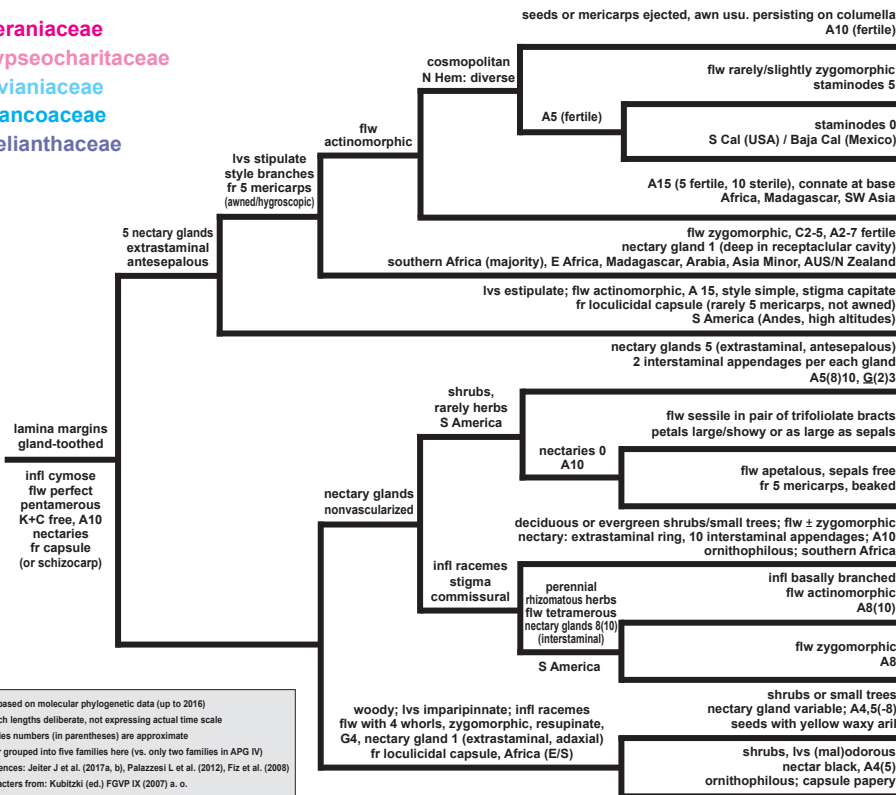
Geraniales Phylogeny Poster (GPP)

The Geraniales Phylogeny Poster (GPP) depicts the phylogenetic relationships between the five families of the order recognized here: Geraniaceae, Hypseocharitaceae, Vivianiaceae, Francoaceae, and Melianthaceae – down to the genus level – based on past and most recent research results. Unifying apomorphic, plesiomorphic, diagnostic, and nondiagnostic traits are mapped on the according nodes of the branches of the tree. All relevant morphological features are listed in a table to provide a clear overview and comparison between the genera. The purpose of the poster is to serve as a free, openly available educational tool and data resource for students, advanced scholars, researchers, and teachers.

Geraniales

phylogeny of the order, families, and genera with characteristics

- Geraniaceae
- Hypseocharitaceae
- Vivianiaceae
- Francoaceae
- Melianthaceae



Geranium (430)

Erodium (80)

California (1)

Monsonia (40)

Pelargonium (280)

Hypseocharis (6)

Viviania (6)

Balbisia (11)

Rhynchotheca (1)

Greyia (3)

Francoa (1)

Tetilla (1)

Bersama (8)

Melianthus (8)

Genus	Distribution	Habit	Stipules	Leaves	Infl	Symmetry	K	C	A (fertile)	A (sterile)	A (total)	G	Stigma	Nectary glands	Nectary gland position	Fruit	Dispersal unit
Geranium	cosmopolitan, N Hem, diverse	perennial or annual herbs (one shrub)	+	palmatifid to palmatisect	cymose	*	5	5	10	0	10	5	reg	5 (vas)	extrastam anteseep, anthophore +	mericarpic	seeds, mericarps (some awned)
Erodium	cosmopolitan, N Hem, diverse	perennial or annual herbs	+	simple to pinnatisect to pinnate	cymose	* rarely slightly X	5	5	5	5	10	5	reg	5 (vas)	extrastam anteseep, anthophore +	mericarpic	mericarps (awned)
California	S Cal (USA)/ Baja Cal (Mex)	annual herb	+	rounded or cordate	cymose	*	5	5	5	0	5	5	reg	5	extrastam anteseep	mericarpic	mericarps (awned)
Monsonia	Africa, Madagascar, SW Asia	shrubs, subshrubs, perennial or annual herbs	+	simple or rarely pinnately incised	cymose	*	5	5	5,15	0,10	15	5	reg	5 (vas)	extrastam anteseep, rarely in small receptacular cavities	mericarpic	mericarps (awned)
Pelargonium	southern Africa (most), E Africa, Madagascar, Arabia, Asia Minor, AUS/N Zealand	subshrubs, perennial or annual herbs	+	entire to much divided to compound, often heteroblastic	cymose	X	5	2-5	2-7	3-8	10	5	reg	1 (vas)	extrastam anteseep, in receptacular cavity, adaxial side of flower	mericarpic	mericarps (awned)
Hypseocharis	S America/Andes (high altitudes)	perennial herbs	-	pinnatifid	cymose	*	5	5	5,15	0	5,15	5	reg	5 (vas)	extrastam anteseep, slightly sunken into receptacle	loculicidal or mericarpic	seeds, mericarps
Viviania	S America	shrubs, subshrubs, rarely annual herbs	-	entire, serrate or lobed	cymose	*	(4)5	(4)5	5(8)10	0	5(8)10	2-3	reg	5 (nonvas)	extrastam anteseep each with two interstaminal appendages	septicarpic	seeds
Balbisia	S America	shrubs	-	entire or pinnatifid to trifoliolate	sessile in trifoliolate bracts	*	5	5	10	0	10	3-5	reg	0	-	septicarpic	seeds
Rhynchotheca	S America	shrub	-	pinnatifid or entire	cymose	*	5	0	10	0	10	5	reg	0	-	mericarpic	mericarps
Greyia	S Africa	shrubs, small trees	-	simple, petiolate, irreg crenate, shallowly lobed	racemes	± X	5	5	10	0	10	5	com	10 (nonvas)	extrastam ring with 10 interstam appendages	septicidal	seeds
Francoa	S America (Patagonia)	perennial herb	-	lyrate-pinnatifid to pinnate	racemes, basally branched	*	4	4	8(10)	0	8(10)	4	com	8 (nonvas)	interstam	septicidal	seeds
Tetilla	S America	perennial herb	-	simple, rounded, palmately veined	racemes	X	4	4	8	0	8	4	com	8 (nonvas)	interstam	septicidal	seeds
Bersama	E to S Africa	shrubs, small trees	+	imparipinnate	racemes	X	4-5	5	4,5(-8)	0	4-8	4	reg	1 (vas)	extrastam, variable shape pronounciation of adaxial side	loculicidal	arilled seeds
Melianthus	E to S Africa	shrubs	+	imparipinnate	racemes	X	5	4	4(5)	0	4(5)	4	reg	1 (vas)	extrastam, adaxial side of the flower	loculicidal (papery)	seeds

Abbreviations: * - actinomorphic, X - zygomorphic, reg - regular, com - commissural, vas - vascularized, nonvas - nonvascularized, extrastam - extrastaminal, interstam - interstaminal, anteseep - antesepalous