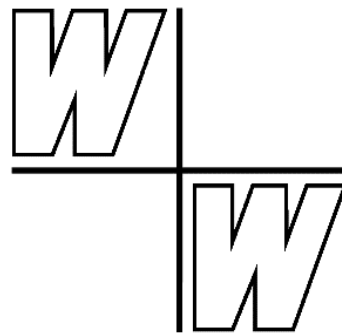


Data Collection on Intergeneric Hybrids and Basic Types:

ANGIOSPERMAE **families J–Z**

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with the assistance of Benjamin Scholl
version 2 01.10.2026



ANGIOSPERMAE

families J–Z

for Orchidaceae see separate file

Arranged alphabetically according to families.
Only a selection of families is listed in this paper.

Delimitation of families and genera after AP website 2026 (= **Angiosperm Phylogeny Group**)
as summarized by P. Stevens (2001 onwards)

<http://www.mobot.org/MOBOT/Research/APweb/welcome.html> accessed 2024/2025.

Subdivision of families after AP website 2026 or en.wikipedia 2026.

Abbreviations:

° = taxa actually not accepted in the rank of a genus, e.g. *Cerasus*° (= *Prunus* p.p.)

10: 50 etc. The numbers behind the names of families etc. refer to extant genera and species

IS = interspecific hybrid. **IG** = intergeneric hybrid. **IST** = intersubtribal hybrid.

IT = intertribal hybrid. **ISF** = intersubfamilial hybrid. **IF** = interfamilial hybrid.

EC = embryo culture or ovule culture

SO = somatic hybrid by cell fusion; normally these hybrids are asymmetric

AS = asymmetric hybrids, they do not equally express maternal and paternal features

HY = assumed intergeneric hybridogeneous origin of a taxon

nat. hyb. = natural hybrid **art. hyb.** = artificial hybrid

Colors within the crosses:

Red letters: intergeneric hybrids (incl. former IG).

Violet = plurigeneric hybrids

Gray letters: hybridity unconfirmed or erroneous.

Green letters: notes on tribes, subfamilies etc. involved in the hybridization.

Yellow shaded: Notes concerning basic types.

Summary of Angiospermae families J-Z (without Orchidaceae)

210 IG (incl. IST + IT + ISF), found in 25 families

32 preliminary basic types.

Basic type level: 5 genera/subtribes, 17 tribes, 3 subfamilies, 7 families.

Average species number per basic type: $13982 / 32 = 432$ species.

Juglandaceae subfamily Juglandoideae 5: 35. **2 IG**

Magnoliaceae 2: 227. **0 IG**

Malvaceae subfamily Fremontodendroideae 2: 3. **1 IG**

Melanthiaceae tribe Parideae 3: 73. **3 IG**

Moraceae tribe Ficeae (*Ficus*) 1: 880. – (a few IS)

Nepenthaceae (*Nepenthes*) 1: 176. – (13 IS)

Oxalidaceae subfamily Oxalidoideae 1: 557. – (2 IS)

Paeoniaceae (*Paeonia*) 1: 34. – (>14 IS)

Passifloraceae Passifloroideae Passifloreae genus *Passiflora* 570. – (ca. 500 IS)

Philesiaceae 2: 2. **1 IG**

Plantaginaceae tribe Veroniceae genus *Veronica* 1: 450. – (12 IS)

Platanaceae (*Platanus*) 1: 10. – (1 IS)

Poaceae Pooideae tribe Triticeae 27: 500. **96 IG**

Ranunculaceae Ranunculoideae Ranunculeae *Ranunculus* (1600). – (69 IS)

Rosaceae Amygdaloideae tribe Amygdaleae (*Prunus*) 1: 200. – (46 IS)

Rosaceae Amygdaloideae Maleae subtribe Malinae 30: 950. **28 IG**

Rosaceae Rosoideae tribe Colurieae 3: 68. **2 IG**

Rosaceae Rosoideae tribe Potentilleae 18: 1740. **3 IG**

Rosaceae Rosoideae tribe Roseae (*Rosa*) 1: 125. – (113 IS)

Rosaceae Rosoideae tribe Rubeae (*Rubus*) 1: 1730 (incl. apomicts). – (69 IS)

Rosaceae Rosoideae tribe Ulmarieae (*Filipendula*) 1: 10. – (2 IS)

Salicaceae Salicoideae tribe Saliceae 2: 664. **1 IG**

Sapindaceae Hippocastanoideae tribe Acereae (*Acer*) 1: 130. – (10 IS)

Sapindaceae Hippocastanoideae tribe Hippocastaneae 3: 17. **0 IG**

Saxifragaceae tribe Heuchereae 16: 83. **6 IG**

Saxifragaceae tribe Saxifrageae (*Saxifraga*) 1: 560. – (86 IS)

Scrophulariaceae tribe Buddlejeae (*Buddleja*) 1: 108. – (11 IS)

Solanaceae Solanoideae tribe Solaneae (*Solanum*) 1: 1240. – (>4 IS)

Theaceae 9: (200–)460. **4 IG**

Viburnaceae tribe Viburneae (*Viburnum*) 1: 175. – (12 IS)

Violaceae subfamily Violoideae genus *Viola* 1: 600. – (ca. 270 IS)

Zosteraceae 3: 15. **0 IG**

General references on Angiospermae

Angiosperm Phylogeny group (Chase MW et al.) (2016) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV.

Bot. J. Linnean Soc. 181, 1–20. <https://doi.org/10.1111/boj.12385> → Stevens

Belea A (1992) Interspecific and intergeneric crosses in cultivated plants. Budapest: Akademiai Kiado.

Brummitt RK (1992) Kew's Vascular Plant Families and Genera. Royal Botanical Gardens Kew. [excellent book, but meanwhile out of date](#)

- Feng Z-H et al. (2024). Nomenclatural novelties for intergeneric nothotaxa. *Phytoneuron* 2024-85: 1–. <https://www.phytoneuron.net/wp-content/uploads/2024/12/85PhytoN-IntergenericNothotaxa.pdf>
- Focke WO (1881) *Die Pflanzenmischlinge*. Berlin: Borntraeger.
- Folk RA et al. (2018) New prospects in the detection and comparative analysis of hybridization in the tree of life. *American Journal of Botany* 105, 364–375
- Haartman JJ (1751) *Plantae hybridae*. Dissertation Uppsala. Lidén no. 33. (also cited as „Linné C von & Haartman JJ (1751) *Plantae hybridae*. Upsaliae.“ and as part of Linné C von (1756) *Amoenitates academicae* 3 (p. 28 ff.)
- <http://ia600602.us.archive.org/25/items/mobot31753000806395/mobot31753000806395.pdf> only of historical interest, not hybrids as defined today!
- Index Kewensis **IK** preceding **IPNI**
- International Plant Names Index (= **IPNI**) = www.ipni.org
- Knobloch IW (1972) Intergeneric hybridization in flowering plants. *Taxon* 21, 97–103. The author writes: ... „No claims are made that the list is complete or absolutely accurate. ... it is pointed out that hybrids, throughout the range, show both dominance and intermediacy ...“
- Mallet J (2007) Hybrid speciation. *Nature* 446, 279–283. <https://doi.org/10.1038/nature05706>
- Mitchell N et al. (2019) Correlates of hybridization in plants. *Evolution Letters* 3, 570–585. <https://doi.org/10.1002/evl3.146> mainly interspecific hybrids, cf. Whitney et al. (2010)
- Oehler E (1956) Art- und Gattungskreuzung. *Handbuch der Pflanzenzüchtung I*, 563–611.
- POWO Plants of the world online (= **POWO**). <https://powo.science.kew.org/> This data base lists more hybrids than IPNI, but names only hybrids to which a scientific name has been attributed!
- Stace CA (1975) *Hybridization and the flora of the British Isles*. Academic Press.
- Stace CA (1995) *New flora of the British Isles*. Cambridge: University Press.
- Stevens PF (2001 onwards). Angiosperm phylogeny website. <https://www.mobot.org/MOBOT/research/APweb/> (= **AP website**).
- Tsitsin NV (ed.) (1960) *Wide hybridization in plants*. Akad. Nauk. SSSR. Translated from Russian. 1962 National Science Foundation, Washington. https://keen101.wordpress.com/wp-content/uploads/2017/12/wide_hybridization_in_plants_tsitsin2.pdf not all data are confirmed
- WFO Plant List <https://www.worldfloraonline.org/>
- Whitney KD et al. (2010) Patterns of hybridization in plants. *Perspect. Plant Ecol. Evol. Syst.* 12, 175–182. mainly interspecific hybrids
- Willis JC (1985) *Dictionary of flowering plants and ferns*, ed. 8 = Student edition. Cambridge University Press.
- Zander R (2008) *Handwörterbuch der Pflanzennamen*. Dictionary of plant names. Dictionnaire de plantes. 18. ed. Stuttgart: Ulmer.

Juglandaceae (Fagales) 9: 51 + fossil taxa. (1 IG + 1 IST)

walnuts = Walnussgewächse

3 subfamilies:

Engelhardioideae 3–4: 14, Juglandoideae 5: 35, Rhoipteleoideae 1: 1 (*Rhoiptelea chilantha*).

Juglandoideae 5: 35. 2 IG (incl. 1 IST)

2 tribes:

Platycaryeae 1: 2 *Platycarya* 2 *longzhouensis*, *strobilacea* (the position of *Platycarya* is uncertain, in the phylogram below it is nested within the genera of Juglandaceae)

Juglandinae:

Juglandinae 3: 21 *Juglans*, *Pterocarya*, *Cyclocarya*.

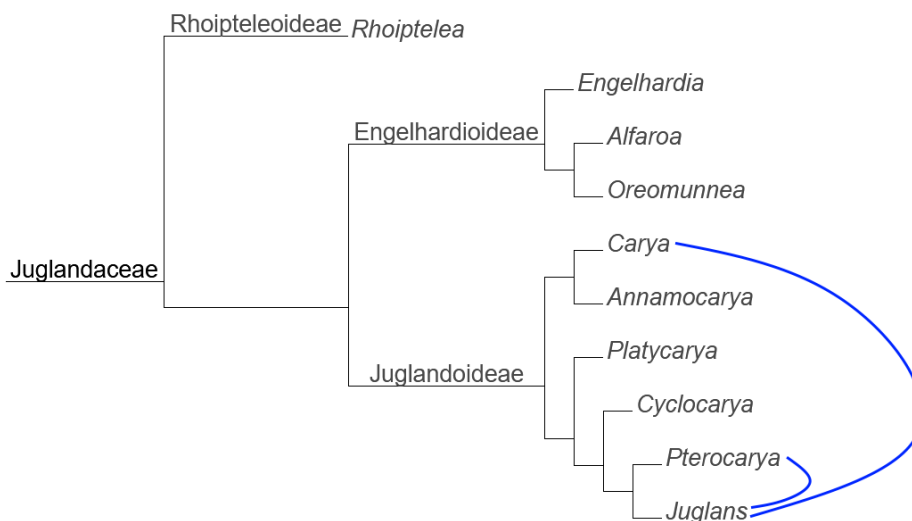
Caryinae 1: 18 *Carya* 18 (incl. *Hicoria*°, *Annamocarya*° *sinensis*, *indochinensis*).

Probably **basic type Juglandaceae subfamily Juglandoideae** (5: 35): The most distant genera are connected by hybridization in the phylogenies of Xiang et al. (2014) and Mu et al. (2020), see the figure below.

IS: POWO (2025): *Carya* 9 IS, *Juglans* 9 IS.

Carya illinoensis, *ovalis* × *Juglans* hybr. IST *Caryinae* × *Juglandinae* Yablokov 1960 (*C. illinoensis*, *ovalis* × *J. hybr.*), Ghazaeian et al. 2023 (*C. illinoensis* × *J. nigra*, *regia*)

Juglans regia × *Pterocarya* *Juglandinae* × *Caryinae* McGranahan et al. 1986, Belea 1992



Juglandaceae: hybrid connections in the phylogeny of Xiang et al. (2014. doi:10.1016/j.ppees.2014.03.001) and Mu et al. (2020. doi:10.1016/j.ympev.2020.106802), from en.wikipedia (2026, CC BY SA 4.0)

References:

Ghazaeian M et al. (2023). Assessment of hybrids between *Carya* and *Juglans* via ISSR markers.

Erwerbs-Obstbau 65, 289–292. <https://doi.org/10.1007/s10341-022-00821-4>

McGranahan GH et al. (1986) Intergeneric hybridization in the Juglandaceae: *Pterocarya* sp. × *Juglans regia*. J. Amer. Soc. Hort. Sci. 111, 627–630.

Mu X-Y et al. (2020) Phylogeny and divergence time estimation of the walnut family (Juglandaceae) based on nuclear RAD-Seq and chloroplast genome data. Molecular Phylogenetics and Evolution. 147 106802. doi:10.1016/j.ympev.2020.106802

Xiang XG et al. (2014) Large-scale phylogenetic analyses reveal fagalean diversification promoted by the interplay of diaspores and environments in the Paleogene. Perspectives in Plant Ecology,

Evolution and Systematics 16, 101–110. doi:10.1016/j.ppees.2014.03.001
Yablokov AS (1960) Wide hybridization in silviculture and greenbelt work. Survey and prospects. In
Tsitsin (ed.) Wide hybridization in plants. Jerusalem. https://keen101.wordpress.com/wp-content/uploads/2017/12/wide_hybridization_in_plants_tsitsin2.pdf

Juncaceae (Poales) 13: 485

rush family = Binsengewächse

Juncus 300 (paraphyletic, since 2022 divided), *Luzula*, ...

IS: POWO (2026): *Juncus* 25 IS, *Luzula* 20 IS, ...

Lamiaceae = Labiatae (Lamiales) 236: 7300. (1 IG)

mint, deadnettle or sage family = Lippenblütler

12 subfamilies.

Ajugoideae 24: 1100, *Callicarpoideae* 1: 170, *Cyamarioideae* 2: 3, *Lamioideae* 63: 1260, *Nepetoideae* 105: 3675, *Peronematoideae* 4: 17, *Premnoideae* 3: 150, *Prostantheroideae* 18: 317, *Scutellarioideae* 5: 380, *Symphorematoideae* 3: 27, *Tectonoideae* 1: 4, *Viticoideae* 13: 376–526.

IS: POWO (2026): *Ajuga* 5 IS, *Bystropogon* 3 IS, ...

In the well-known family **Lamiaceae** nearly no intergeneric hybrids are known though it is rather large and hybridization could be of economic importance.

Lamioideae

Lamium × *Stachys* (= *Betonica*) *officinalis* **IT** *Lamieae* × *Stachyeae* (→ *Stachys* ‘Lilac Falls’).
<https://www.finegardening.com/article/a-beautiful-result-of-crossing-two-amazing-plants>, (sterile),
unconfirmed and with no published nothogenus name, very questionable, but available as
ornamental plant. A former comment in the internet was: „I suppose this only a variety of *Stachys*
officinalis. I have neither found the name of the *Lamium*-species, nor characteristics of this genus.”

Nepetoideae 105: 3675

Mentheae 60: 2100. 1 IG

Amaracus° (= *Origanum* p.p.) × *Majorana*° (= *Origanum* p.p.) **IS** (→ × *Majoranamaracus* K. H.
Rechinger 1938 in Fedde, Repert. 45, 95) **IK** 1947, Knobloch 1972

Calamintha° (= *Clinopodium* p.p.) × *Clinopodium* **IS** (→ × *Calapodium* J. Holub 1976 Folia Geobot.
Phytotax 11, 82) **IPNI** 2008

Calamintha° (= *Clinopodium* p.p.) × *Micromeria* (→ × *Calamicromeria* Silic 1974 (publ. 1975)
Glasn. Zem. Muz. Bosne Herceg. Prir. Nauke 13, 111) **IPNI** 2008

Clinopodium × *Micromeria* (→ × *Clinomicromeria* Govaerts 1999 Word Checklist Seed Pl. 3, 15),
IPNI 2011

Majorana° (*Origanum*) *hortensis* × *Origanum vulgare* **IS** (→ × *Origanomajorana* Domin 1935 in
Preslia 13–15, 197, in adnot.) **IK** 1938, Knobloch 1972

Lentibulariaceae (Lamiales) 3: 390

bladderwort family = Wasserschlauchgewächse

Carnivorous.

Genlisea, *Lentibularia*, *Utricularia*.

Liliaceae (Liliales) 15: 610

lily family = Liliengewächse

4 subfamilies.

Brachycyrtis[°] (*Tricyrtis*) × *Tricyrtis* **IS** *Calochortoideae* Knobloch 1972

Loganiaceae (Gentianales) 13: 1420

logania family = Brechnussgewächse

Many genera have been moved to other families.

IS: POWO (2026): 0 *IS*.

References:

Motley TJ & Carr GD (1998) Artificial hybridization in the Hawaiian endemic genus *Labordia* (Loganiaceae). Amer. J. Bot. 85, 654–660. [crosses without success!](#)

Lythraceae (Myrtales) 30: 700 + extinct taxa. 1 IG

loosestrife family = Blutweiderichgewächse

5 subfamilies:

e.g. *Lythroideae* 26. The other 4 subfamilies are monogeneric.

Heimia × *Lagerstroemia* *Lythroideae* Lin et al. 2025 (EC, 1 true hybrid)

References:

Lin Q et al. (2025) Obtained intergeneric hybrids from distant hybridization between *Lagerstroemia* and *Heimia*. Ornamental Plant Research 5: e017. doi: [10.48130/opr-0025-0016](https://doi.org/10.48130/opr-0025-0016)
<https://www.maxapress.com/article/id/67ff0242fa6c5866a7a9ea99>

Magnoliaceae (Magnoliales) 2: 227 + extinct species

magnolia family = Magnoliengewächse

Liriodendron 2, *Magnolia* 225.

Probably **basic type family Magnoliaceae** (2: 227): well-defined isolated group.

IS: POWO (2026): *Magnolia* 7 *IS*.

Magnolia × *Michelia*[°] (*Magnolia*) **IS** Wang et al. 2005

Magnolia virginiana × *Manglietia*[°] (*Magnolia*) *insignis* **IS**

<http://www.freepatentsonline.com/y2003/0145358.html> (patent by Christopher S Early, 2003)

Manglietia[°] (*Magnolia*) × *Michelia*[°] (= *Magnolia* p.p.) **IS** Zhang & Xia 2007

Michelia[°] (*Magnolia*) × *Yulania*[°] (*Magnolia*) **IS** Zhang et al. 2011

References:

Wang YL et al. (2005) Chromosome numbers of 13 taxa and 12 crossing combinations in Magnoliaceae. Acta Phytotax. Sinica 43 (6), 545–551. *Magnolia* × *Michelia*, probably symmetric
Zhang XH & Xia NH (2007) A karyomorphological study of the genera *Michelia* and *Manglietia* (Magnoliaceae). Caryologia 60, 52–63.
Zhang SZ et al. (2011) Genome differentiation in Magnoliaceae as revealed from meiotic pairing in interspecific and intergeneric hybrids. J. Syst. Evol. 49, 518–527.
<http://onlinelibrary.wiley.com/doi/10.1111/j.1759-6831.2011.00164.x/abstract> *Michelia* × *Yulania*

Malvaceae (incl. Bombacaceae, Byttneriaceae, Sterculiaceae) (Malvales) **243: 4200. (7 IG + 2 IT)**

mallow family = Malvengewächse

11 subfamilies:

Bombacoideae 17: 1640, Brownlowioideae 10: 98, Byttneroideae 23: 650, Dombeyoideae 15: 337, Durionoideae 5: 39, Fremontodendroideae 2: 3, Grewioideae 24: 770, Helicteroideae 8: 95, Malvoideae 78: 1800, Matisioideae 3: 26, Sterculoideae 13: 430, Tilioideae 3: 50.

Byttnerioideae 23: 650

4 tribes.

Herrania (“*Theobroma*”) × *Theobroma* **Theobromateae** (art. hyb., *H. mariae* × *T. cacao*) Addison & Tavares 1952, Silva et al. 2004; fruit set was achieved but no germination

Fremontodendroideae 2: 3. 1 IG

flannelbush and Mexican hand tree

Formerly part of Bombacoideae or Sterculoideae.

Chiranthodendron 1, *Fremontodendron* 2.

Probably **basic type Malvaceae subfamily Fremontodendroideae (2: 3): the 2 genera are connected by hybridization.**

IS: en.wikipedia (2026): *Fremontodendron* 1 **IS** (*californicum* × *mexicanum*).

Chiranthodendron pentadactylon × *Fremontodendron* (→ × *Chiranthomontodendron* Dorr 2009 Taxon 58 (4): 1357; = × *Chiranthofremontia*° J. Henrickson 1991 in *Aliso* 13, 239; = × *Leelenzia*° *ranchorum*) Henrickson 1991. IK 1996, AP website 2026

Malvoideae 78: 1800

Formerly separate family Malvaceae.

5 clades/tribes:

Alyogyne 1: 6, Gossypieae 8: 126, Hibisceae 33: 857, Malveae 73: 600–1000, Pentaplaeae 1: 3.

Possibly **basic type Malvaceae subfamily Malvoideae** as a well-defined taxon with its unique floral structure. But further studies are necessary to clarify the basic type situation.

Gossypieae 8: 126. 2 IT

Characterized by its unique glands able to synthesize the pigment gossypol.

Gossypium 50, ...

Alcea rosea × *Gossypium hirsutum* **IT Malveae × Gossypieae** Vysotskii 1960 (art. hyb., fertile)

<http://forums.gardenweb.com/forums/load/hybrid/msg0222353326819.html> (confirmation needed)

Gossypium hirsutum × *Hibiscus panduraeformis* **IT Gossypieae × Hibisceae** (art. hyb.) Chow 1956, 1957, Mehetre et al. 1980 (intermediate, mainly sterile), see Hinsley 2026

Gossypium hirsutum × *Hibiscus cannabinus*, *coccineus*, *moscheutos* **IT Gossypieae × Hibisceae** Vysotskii 1960 (confirmation wanted)

Gossypium hirsutum × *Malva neglecta*, *pulchella* **IT Gossypieae × Malveae** (art. hyb.) fertile Vysotskii 1960 (confirmation wanted)

Gossypium × *Neogossypium*° (*Gossypium*) **IS Gossypieae** (→ „× *Hemiultragossypium*“ Roberty 1949 in *Cot. & Fibr. Trop.* 4 (Nomencl. & Taxon. Cotton.) 91; incorrect name) IK 1959, Knobloch 1972, Willis 1985

Gossypium div. spec. × *Thurberia*° *thespesioides* (= *Gossypium thurberi*) **IS Gossypieae** Harland &

Atteck 1931, Knobloch 1972

Hibisceae 73: 600–1000. **1 IG**

Abelmoschus 15, *Cenocentrum* 1, *Hibiscus* 550, ...

Abelmoschus esculentus („*Gossypium esculentum*“) × *Gossypium hirsutum* **IT** **Hibisceae** × **Gossypieae** (art. hyb.) Vysotskii 1960 unconfirmed

~~*Abelmoschus* × *Gossypium*~~ **unsuccessful** Vlachostergios et al. 2007, Kantartzi & Roupakias 2008

Abelmoschus esculentus × „*Hibiscus*“ *manihot*“ (= *Abelmoschus manihot*) **IS** (*Abelmoschus glutinotextile*) Hamon & Yapo 1986, Belea 1992

Cenocentrum tonkinense × *Hibiscus indicus* Blanchard (cited after Hinsley 2026). Closely related.

~~*Hibiscus rosa-sinensis* × *Lavatera thuringiaca*~~: Attempts to create cell hybrids were **unsuccessful** **SO** **IT** **Hibisceae** × **Malveae** see Hinsley 2026

Malveae 70: 1040. **5 IG**

Abutilon 120, *Alcea* 50, *Althaea* 12, *Anoda* 10, *Callianthe* 50 (sometimes included in *Abutilon*), *Lavatera* 15, *Malva* 61, *Periptera* 4, *Sida* 200, ...

Abutilon × *Callianthe*^o (*Abutilon*) **IS** (→ × *Abutilanthe* doi: [10.21273/HORTSCI19073-25](https://doi.org/10.21273/HORTSCI19073-25) (POWO 2026 accepts the genus)

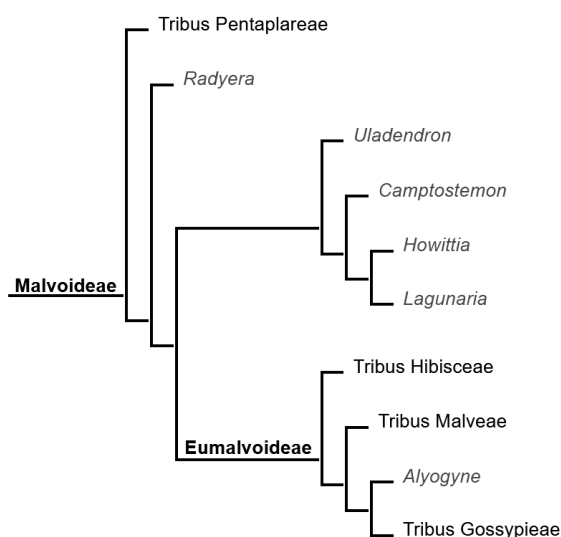
Alcea rosea × *Althaea officinalis* (→ × *Alcalthaea* 2007 Hinsley Plantsman n. s. 6 (4): 227–231) Hinsley 2011, IPNI 2008, <http://www.hardys-plants.co.uk/products.asp?genus=12>

Alcea × *Malva* Knobloch 1972 (*A. rosea* × *M. sylvestris*)

Althaea × *Malva* (→ × *Malvalthaea* Riedl 1976 in Rechinger, Flora Iranica 120: 8–10) (nat. hyb. in Iran, putative palaeohybrid: *A. hirsuta* = *Malva hirsuta* × *M. aegyptia*; interspecific in a revised taxonomy; for details see: <http://www.malvaceae.info/Genera/Malva/Malvalthaea.html>) Knobloch 1972, Willis 1985, Hinsley 2011

Anoda × *Periptera* (art. hyb., *A. thurberi* × *P. punicea*) Bates 1987, Tate et al. 2005, see Hinsley 2026

Lavatera × *Malva* (*L. cretica*, *mauritanica* × *Malva*, *L. trimestris* × *M. 'Bicolor'*, pers. comm. of Michael Barclay 2005 to Hinsley 2011; nat. hyb. of hybridogeneous origin = **HY**: *L. thuringiaca* × *M. moschata* → *Malva alcea*) see Hinsley 2026



Malvaceae subfamily Malvoideae: phylogeny of Areces-Berazain F et al. (2017)

<https://doi.org/10.1093/botlinnean/box035> and Colli-Silva M et al. (2025) <https://doi.org/10.1002/tax.13300>, from de.wikipedia (2026, CC BY SA 4.0).

References:

- Addison G & Tavares R (1952) Hybridization and grafting in species of *Theobroma* which occur in Amazonia. *Evolution* 6 (4), 380–386. [Hybridization and grafting in species of *Theobroma* which occur in Amazonia](#). *Theobroma cacao* × *Herrania mariae* (= „*Theobroma mariae*“)
- Bates DM (1987) Chromosome numbers and evolution in *Anoda* and *Periptera* (Malvaceae). *Aliso* 11, 523–531.
- Chow CW (1956) Preliminary tests on the intergeneric cross between *Gossypium* and *Hibiscus*; a conspicuous increase in the length of the lint. *Acta Agric. Sinica* 7, 89.
- Chow CW (1957) Segregation of characters in an intergeneric hybrid between *Gossypium* and *Hibiscus*. *Fukien Agric. J.* 6, 1–20.
- Hamon S & Yapo A (1986) Perturbation induced within the genus *Abelmoschus* by the discovery of a second edible okra species in West Africa. *Acta Hort.* 182, 133–143.
- Harland SC & Atteck OS (1931) Intergeneric hybrids between *Gossypium* and *Thurberia*. *Amer. Naturalist* 65, 380–381. <http://www.jstor.org/pss/2456877>
- Henrickson J (1991) × *Chiranthofremontia*, an intergeneric hybrid of *Chiranthodendron pentadactylon* and *Fremontodendron* 'Pacific Sunset'. *Aliso* 13 (1), 239–248.
- Hinsley SR (2007) *Alcea* × *Althaea*, the hybrids from Hungary. *The Plantsman* 6 (4), 227–231.
- Hinsley SR (2026) Intergeneric hybrids in Malvaceae. <https://www.malvaceae.info/Genera/Hybrids/Hybrids.php#Ref4>
- Kantartzi S & Roupakias DG (2008) Production of aneuploids of the cotton hybrid *G. barbadense* × *G. hirsutum* L. via intergeneric pollination with *Abelmoschus esculentus*. *Euphytica* 161 (3), 319–327. <http://www.springerlink.com/content/yl364735531rh4n/>
- Mehetre SS et al. (1980) Cytomorphological studies in an intergeneric hybrid between *Gossypium hirsutum* L. (2n = 52) and *Hibiscus panduriformis* Burm. *Euphytica* 29 (2), 323–330. <https://link.springer.com/article/10.1007/BF00025130>
- Nassar NM & Silva YR (1986) Interspecific hybridization between cassava and wild *Manihot* species. *Cien. Cult.* 38, 1050–1055.
- Silva CRS et al. (2004) Description of Amazonian *Theobroma* L. collections, species identification, and characterization of interspecific hybrids. *Acta Bot. Bras.* 18 (2), 333–341. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-33062004000200012
- Tate JA et al. (2005) Phylogenetic relationships within the tribe Malveae (Malvaceae, subfamily Malvoideae) as inferred from ITS sequence data. *Amer. J. Bot.* 92 (4), 584–602. <http://www.amjbot.org/content/92/4/584.abstract> *Anoda* × *Periptera*
- Vlachostergios DN et al. (2007) In-vitro development of ovules obtained after pollination of cotton (*Gossypium* spp.) flowers with pollen from okra (*Abelmoschus esculentus* L–Moench). *Plant cell tissue and organ culture* 88 (1), 109–115. [crosses failed](#)
- Vysotskii KA (1960) Wide hybridization in the Malvaceae. p 301–307 in Tsitsin NV [= Cicin NV] (ed.) *Wide hybridization in plants*. English translation 1962. Jerusalem: Israel program for scientific information. <http://www.bulbnrose.org/Heredity/CottonHybrids/CottonHybrids.html> for details and comments see Hinsley 2026

Melanthiaceae (incl. Trilliaceae) (Liliales) 13–16: 170. (2 IG)

bunchflower family = Germergewächse

5 tribes.

Parideae (= Trilliaceae) 3: 73. 2 IG

Einbeeren-Verwandte

Paris 29 (incl. *Daiswa*° 20, *Kinugasa*° 1 *japonica*), *Trillium* 43 (incl. *Trillidium*° 1 *govanianum*), *Pseudotrillium* 1.

Probably **basic type Melanthiaceae tribe Parideae** (3: 73). This tribe is very peculiar. All 3 genera are connected by hybridization if one accepts that the octoploid species *Paris japonica* as well as *Trillium govanianum* are the result of hybridization between *Paris* and *Trillium*.

Daiswa[°] (*Paris*) × *Trillium* **HY** Fukuda 2001 (supposed intergeneric hybridogeneous origin of *Trillium govanianum*)
Paris × *Trillium* **HY** (supposed hybridogeneous origin of *Paris japonica*) Knobloch 1972, Rutishauser & La Cour 1956a, b, Fukuda 2014 (→ *Paris japonica* = *Kinugasa*[°] *japonica*; octoploid: 2n = 8x = 40, Yang et al. 2019 (it is supposed that this octoploid species is the result of allopolyploidy of *Paris* and *Trillium*)
Pseudotrillium rivale (= *Trillium rivale*) × *Trillium ovatum* (originally described as interspecific *T. rivale* × *T. ovatum* → *T. × crockerianum*) en.wikipedia 2025

References:

- Fukuda I (2001) The origin and evolution in *Trillium* 1. The origin of the Himalayan *Trillium govanianum*. Cytologia 66, 105–111.
 Fukuda I (2014) Evolutionary genetics on *Trillium* in Asia and North America. 1.
https://www.jstage.jst.go.jp/article/cytologia1929/66/1/66_1_105/_pdf
 Rutishauser A & La Cour F (1956a) Spontaneous chromosome breakage in endosperm. Nature 177, 324–325.
 Rutishauser A & La Cour F (1956b) Spontaneous chromosome breakage in hybrid endosperms. Chromosoma 8, 317–340.
 Yang L et al. (2019) Chloroplast phylogenomic analysis provides insights into the evolution of the largest eukaryotic genome holder, *Paris japonica* (Melanthiaceae). BMC Plant Biol 19, 293
<https://doi.org/10.1186/s12870-019-1879-7> Discussion of the origin of the very large genome of this octoploid plant

Melastomataceae (Myrtales) 177: 5750. (2 IG + 1 IT)

melastome family = **Schwarzmundgewächse**

3 subfamilies: Kibessioideae 1: 15, Melastomatoideae 182: 4500, Olisbeoideae 6: 556.

Melastomatoideae 182: 4500. 2 IG + 1 IT

20 tribes.

Bertolonia × *Sonerila* **Bertolonieae** × *Sonerileae* **IT** (→ × *Bertonerila houtteana* hort., described by Louis van Houtte ca. 1870) Zander 2008. There exist very old colored pictures of this plant, e.g. http://www.finerareprints.com/print_detail.html?stock_no=10932. Probably it is the same cross which was cited by Knobloch 1972 as „*Cassebeeria*[°] (= *Sonerila*) × *Gravesia* (= *Bertolonia* p.p.) *guttata*”. See also: Wiener illustrierte Garten-Zeitung (1879)
<http://ia600200.us.archive.org/20/items/wienerillustirt21kais/wienerillustirt21kais.pdf>, POWO 2026 (no entry)

Dissotis × *Tibouchina* **Melastomateae** Hawkins et al. 2016 (*D. canescens* × *T. lepidota*, art. hyb.)
Phyllagathis × *Sporoxeia* **Sonerileae** Zhou et al. (2020) (*P. longicalcarata* × *S. petelotii*, art. hyb., sterile)

References:

- Hawkins SM et al. (2016) Interspecific and intergeneric hybridization in *Dissotis* and *Tibouchina*. HortScience 51, 325–329.
 Zhou S et al. (2020) Natural hybridization between *Phyllagathis* and *Sporoxeia* species produces a hybrid without reproductive organs. PLOS ONE 15 (1) Art.–Nr. e0227625.

Mesembryanthemaceae → Aizoaceae

Moraceae (Rosales) 39: 1137 + many fossil genera

7 tribes: Chlorophoreae 1: 13, Ficeae 1: 880, ...

Probably **basic type Moraceae tribe Ficeae** (*Ficus*) (1: 880) as a well-defined taxon with a unique urn-shaped inflorescence and a very specialized pollination by wasps of the family Aganoidae. According to Wang et al. (2021) (ancient) *Ficus* hybridization is remarkably common, even occurring between members of clades that have been separated for perhaps 70 Ma.

IS: POWO (2026): *Ficus* 0 IS.

For natural IS in the *Ficus auriculata* group see Wei et al. 2014; for artificial hybrids see also DOI: [10.17520/biods.2018318](https://doi.org/10.17520/biods.2018318)

Cudrania^o *tricuspidata* (= *Maclura* p.p.) × *Maclura pomifera* IS Chlorophoreae = Maclureae (→ × *Macludrania*) (art. hyb.) Knobloch 1972, Zander 2008, IPNI 2011

Broussonetia × *Morus* IT Dorstenieae × Moreae Ogure et al. 1985a, b → only very early stages of embryo development and no real hybrids

References:

- Ogure M et al. (1985a) Crossability between mulberry (*Morus* spp.) and *Broussonetia kazinoki*. [Japanese] J. Sericultural Science of Japan 54 (2), 159–164.
- Ogure M et al. (1985b) Germination of pollen of mulberry and *Broussonetia kazinoki* on stigma of mulberry and development of ovule. [Japanese] J. Sericultural Science of Japan 54 (5), 382–388.
- Wang G et al. (2021) Genomic evidence of prevalent hybridization throughout the evolutionary history of the fig-wasp pollination mutualism. Nature Communications 12. doi:10.1038/s41467-021-20957-3.
- Wei D-Z et al. (2014) Genetic structure and hybridization in the species group of *Ficus auriculata*: Can closely related sympatric *Ficus* species retain their genetic identity while sharing pollinators? Molecular Ecology 23 (14). DOI:10.1111/mec.12825

Musaceae (Zingiberales) 3: 93

banana family = Bananengewächse

Ensete 6–10, *Musa* 85, *Musella* 1.

en.wikipedia 2024: Hybridization and polyploidy was the cause of much confusion in the taxonomy of the genus *Musa* that was not resolved until the 1940s and 1950s.

IS: POWO (2026): *Musa* 4 IS.

Myrtaceae (Myrtales) 131: 5900. (2 IG)

myrtle family = Myrtengewächse

2 subfamilies: Heteropyxidoideae 2: 4, Myrtoideae 129: 5900.

Myrtoideae 129: 5900. 2 IG

18 tribes.

Chamelaucium floriferum × *Verticordia plumosa* Chamelaucieae Egerton-Warburton et al. 1998 (spont. hybrid in culture)

Kunzea sinclairii × *Leptospermum scoparium* Leptospermeae (→ × *Kunzspermum* W. Harris 1993 in Hort. New Zealand 4, 10) Harris et al. 1992, Patel 1994, Bicknell 1995, IK 1996, de Lange 2005, IPNI 2011

References:

- Bicknell R (1995) Breeding cut flower cultivars of *Leptospermum* using interspecific hybridisation.

New Zealand J. Crop & Horticultural Science 23(4), 415–421.
 de Lange PJ et al. (2005) Hybridism in the *Kunzea ericoides* complex (Myrtaceae): an analysis of artificial crosses. Australian Syst. Bot. 18 (2), 117–131. *Kunzea* × *Leptospermum*.
 Egerton-Warburton LM et al. (1998) Intergeneric hybridism between *Chamelaucium* and *Verticordia* (Myrtaceae) based on analysis of essential oils and morphology. Australian J. Bot. 46, 201–208.
 Harris W et al. (1992) Observations on the biosystematic relationships of *Kunzea sinclairii* and on an intergeneric hybrid *Kunzea sinclairii* × *Leptospermum scoparium*. New Zealand J. Botany 30, 213–230.
 Patel RN (1994) Wood anatomy of the dicotyledons indigenous to New Zealand 23. Myrtaceae-Subfam. Leptospermoideae (part I). New Zealand J. Botany 32 (1), 95–112.

Nepenthaceae (Caryophyllales) 1: 176

Asian or tropical pitcher plants, monkey cups, Kannenpflanzengewächse

Carnivorous tropical plants. Part of the carnivorous families within the order Caryophyllales, see Droseraceae.

Probably **basic type Nepenthaceae** (*Nepenthes*) (1: 176) as a well-defined monogeneric carnivorous family with unique pitchers and the common chromosome number $2n = 80$. All species are closely related.

IS: POWO (2026): *Nepenthes* 13 IS.

Nothofagaceae (Fagales) 1: 35 + extinct taxa

southern beeches = Südbuchengewächse

Formerly part of Fagaceae. Southern hemisphere.

Nothofagus 35.

IS: POWO (2026): *Nothofagus* 4 IS.

Nymphaeaceae (Nymphaeales) 3: 65 + fossil genera

water lilies = Seerosengewächse

Basic angiosperms.

2 subfamilies: *Nupharoideae* 1: 11, *Nymphaeaoideae* 2: 54.

Barclaya 8, *Nuphar* 11, *Nymphaea* 46 (incl. *Euryale*°, *Ondinea*°, *Victoria*°).

Possibly **basic type Nymphaeaceae** (3: 65) as a well-defined basic taxon though intergeneric hybrids have not been reported.

IS: POWO (2026): *Nuphar* 5 IS, *Nymphaea* 4 IS.

Oleaceae (Lamiales) 24: 700. 1 IG

olive family = Ölbaumgewächse

5 tribes:

Fontanesieae 1: 1–2, *Forsythieae* 2: 10, *Jasmineae* 3: 300, *Myxopyreae* 3: 7, *Oleeae* 16: 420.

IS: POWO (2026): *Forsythia* 1 IS, *Fraxinus* 5 IS, *Jasminum* 1 IS.

Abeliophyllum × *Forsythia* *Forsythieae* Shen et al. 2017 (*A. distichum* × *F. suspensa*, intermediate, low seed set)

Forsythia div. spec. × *Syringa* div. spec. IT *Forsythieae* × *Jasmineae* Ochatt & Patat-Ochatt 1955 (SO, asymmetric)

Osmanthus (*Siphonosmanthus*^o) *delavayi* × “*Phillyrea*” *decora* (*Osmanthus decorus*) IS Oleaceae (→ × *Osmarea* 1931 hort. ex Gard. Chron., Ser. III, 89, 438, in obs.; confer × *Osmarea burkwoodii* Burkwood & Skipwith) IK 1938, Willis 1985, Zander 2008 (notice: *Phillyrea decorata* is now *Osmanthus*, but the rest of the genus remains in *Phillyrea*), IPNI 2011

References:

- Ochatt SJ & Patat-Ochatt EM (1955) Protoplast technology for the breeding of top-fruit trees (*Prunus*, *Pyrus*, *Malus*, *Rubus*) and woody ornamentals. *Euphytica* 85, 287–294. *Forsythia* × *Syringa* SO, asymmetric?
Shen JS et al. (2017) Obtainment of an intergeneric hybrid between *Forsythia* and *Abeliophyllum*. *Euphytica* 213, UNSP 95. <https://doi.org/10.1007/s10681-017-1880-x>

Onagraceae = Oenotheraceae (Myrtales) 22: 756

evening primrose family = *Nachtkerzengewächse*

2 subfamilies:

Jussiaeioideae 1: 82 (*Ludwigia*).

Onagroideae (6 tribes) 21: 574 *Chamaenerion*, *Circaea*, *Clarkia* 42, *Epilobium* 165, *Fuchsia* 195, *Oenothera* 145 (incl. *Gaura*), ...

IS: POWO (2026): *Circaea* 8 IS, *Epilobium* 84 IS, *Fuchsia* 3 IS *Ludwigia* 2 IS, *Oenothera* 9 IS.

Epilobium × *Zauschneria*^o (= *Epilobium* p.p.) Johansen 1931 („... The morphological phenomena tend to support the hypothesis that the genus *Zauschneria* is itself a type of intergeneric hybrid ...”)

Oenothera affinis × „*Onagra*^o” (*Oenothera*) *oakesiana* IS Schwemmle 1927 → this hybrid connects subsections *Munzia* and *Oenothera* of *Oenothera* sect. *Oenothera*.

References:

- Johansen DA (1931) Studies on the morphology of the Onagraceae – V. *Zauschneria latifolia*, typical of a genus characterized by irregular embryology. *Ann. New York Acad. Sci.* 33, 1–26.
Schwemmle J (1927) Der Bastard *Oenothera Berteroana* × *Onagra* (*muricata*) und seine Zytologie. *Jahrb. Wiss. Bot.* 66, 579–595.

Orchidaceae (Asparagales) 880: 26000

See separate file.

Orobanchaceae (Lamiales) 104: 2565

broomrapes = *Sommerwurzgewächse*

This family has been much enlarged by genera formerly included in Scrophulariaceae.

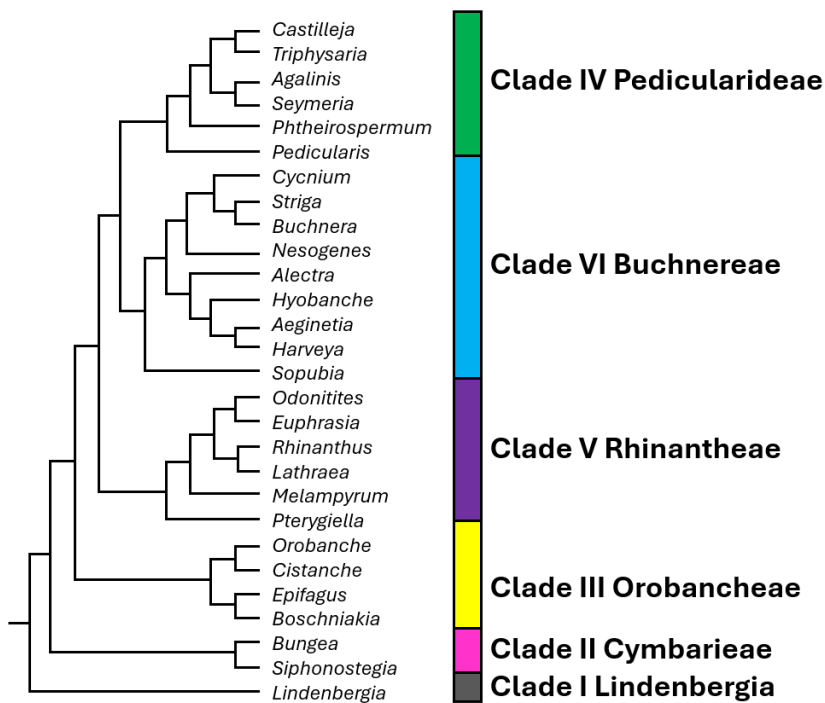
Nearly all members are holo- or hemiparasitic on the roots of other plants. Non-parasitic are *Lindenbergia* 12, *Rehmannia* 5, and *Triaenophora* 2.

Monophyletic.

8 tribes:

Brandisieae 1: 13, *Buchnereae* 16: 390. *Cymbarieae* 6: 14, *Lindenbergieae* 1: 12, *Orobancheae* 9: 290, *Pedicularieae* 14: 1025, *Rehmannieae* 2: 7, *Rhinanthaeae* 18: 540.

Preliminary notes on the basic type situation in **Orobanchaceae**: A view on the phylogeny of Mutuku JM et al. (2020), see the figure below, in accordance with morphological and physiological data suggests, that all tribes form a basic type, each. But no intergeneric or intertribal hybrids have yet been reported. So, it is too soon for definite statements.



Orobanchaceae: phylogeny according to Mutuku et al. (2020. doi:[10.1111/nph.17083](https://doi.org/10.1111/nph.17083)).

Orobancheae 9: 290

Holoparasitic.

Cistanthe 10, *Orobanche* 174, ...

IS: POWO (2026): *Orobanche* 0 IS.

Pedicularieae 14: 1025

Hemiparasitic.

Pedicularis 711, *Castilleja* 180, ...

IS: POWO (2026): *Castilleja* 2 IS, *Pedicularis* 36 IS.

Rehmannieae 2: 7

Non-parasitic.

Rehmannia 5, *Triaenophora* 2.

Rhinanthaeae 18: 540

Hemiparasitic or holoparasitic (*Lathraea*).

Bartsia, *Euphrasia* (170–350), *Lathraea*, *Melampyrum* 35, *Rhinanthus* 45, *Tozzia*, ...

IS: POWO (2026): *Euphrasia* 32 IS.

References:

Mutuku JM et al. (2020) Orobanchaceae parasite–host interactions. *New Phytologist* 230 (1).
doi:[10.1111/nph.17083](https://doi.org/10.1111/nph.17083)

Oxalidaceae (Oxalidales) 6: 627

wood sorrel family = Sauerkleegewächse

2 subfamilies:

Averrhoideae 4: 75, Oxalidoideae 1: 557.

Oxalidoideae 1: 557

Oxalis 557.

Probably **basic type Oxalidaceae subfamily Oxalidoideae** (*Oxalis*) (1: 557) as a well-defined monogeneric subfamily with a wide range of variation. But only 2 interspecific hybrids are known so far.

IS: POWO (2026): *Oxalis* 1 IS (*corniculata* × *dillenii*).

<https://www.nargs.org/plant-of-the-month/oxalis-ione-hecker>: *Oxalis* 1 IS (*enneaphylla* × *laciniata*)

Paeoniaceae (Saxifragales) 1: 34

peonies = Pfingstrosengewächse

Paeonia (3 sections) 32.

Hong 2021: 2 subgenera:

subgenus *Moutan* (woody, China) 9. 2 sections: *Delavayanae* 2 *delavayi* (incl. *lutea* + *potaninii*), *ludlowii*; *Moutan* 7 (*cathayana*, *decomposita*, *jishanensi*, *ostii*, *qiui*, *rockii*, *rotundiloba*, × *suffruticosa* (a cultivated hybrid swarm *P. ostii* × *P. rockii* × *P. spontanea*))

subgenus *Paeonia* (herbaceous) (5 sections) 25 *Albiflorae* 5 (*anomala*, *emodi*, *lactiflora*, *sterniana*, *veitchii*); *Paeonia* 7 (*arietina*, *intermedia*, *officinalis*, *parnassica*, *peregrina*, *saueri*, *tenuifolia*); *Obovatae* 2 (*mairei*, *obovata*), *Corallinae* 9 (*algeriensis*, *broteri*, *cambessedesii*, *clusii*, *coriacea*, *corsica*, *daurica* (incl. *macrophylla*, *wittmanniana*), *kesrouanensis*, *mascula*); *Onaepia* 2 (*brownii*, *californica*).

Basic type family Paeoniaceae (1: 34): Kutzelnigg (2025). The monogeneric family is well-defined with a unique set of characteristics and an isolated position with many hybrids including intersectional and intersubgeneric hybrids.

IS: POWO (2024): *Paeonia* 8 IS.

More than 1000 cultivars exist.

Examples of interspecific hybrids within *Paeonia* are:

P. arietina × *P. mascula* → *P. × kayae* *Paeonia* *Paeonia* × *Paeonia* *Corallinae* (nat. hyb. Türkiye) POWO 2024

P. brownii × *peregrina* *Paeonia* *Onaepia* × *Paeonia* *Paeonia* (art. hyb.) Burkhardt 2024: „Galen Burrell reported in APS Bulletin 321 of successful crosses (only 1 year old)“

P. cathayana × *P. jishanensis* × *P. qiui* × *P. rockii* → *P. suffruticosa* *Moutan* *Moutan* (art. hyb.)

P. daurica × *P. tenuifolia* → *P. × saundersii* = × *maleevii* *Paeonia* *Corallinae* × *Paeonia* *Paeonia* (nat. hyb. Krym, Caucasus) POWO 2024

P. delavayi var. *lutea* × *P. lactiflora* *Moutan* *Delavayanae* × *Paeonia* *Albiflorae* (art. hyb.) this is the first case of an „intersectional hybrid“ (following Hong 2021 intersubgeneric), crossed by Toichi Itoh 1954. Therefore, this type of hybrids is also called „Itoh-intersectional“; they are herbaceous with a small woody base. Famous cultivars are ‘Bartzella’ (yellow flowers) or ‘Cora Louise’ (light violet to white flowers).

P. delavayi × *P. lactiflora* *Moutan* *Delavayanae* × *Paeonia* *Albiflorae* Pehrson & Laning 1996 (art. hyb., see Smith 1997)

P. delavayi × *P. × suffruticosa* → „*P. × lemoinei* group“ *Moutan* *Delavayanae* × *Moutan* *Moutan* (art. hyb.)

P. jishanensis × *P. rockii* → *P. yananensis* (nat. hyb. China) *Moutan* *Moutan* POWO 2024

P. lactiflora × *P. officinalis* → „true red hybrids“ *Paeonia* *Albiflorae* × *Paeonia* *Paeonia* (art. hyb.)

P. lactiflora × *P. peregrina* → „coral hybrids“ *Paeonia* *Albiflorae* × *Paeonia* *Paeonia* (art. hyb.)

P. lactiflora × *P. tenuifolia* → × *smouthii*, „fern leaf hybrids“ *Paeonia* *Albiflorae* × *Paeonia* *Paeonia*

(art. hyb.)

P. qiui × *P. rockii* → *P. × baokangensis* Moutan (nat. hyb. China) POWO 2024

P. × suffruticosa × *P. tenuifolia* Moutan Moutan × *Paeonia* *Paeonia* (art. hyb.) Gilbertson 1977 (see Smith 1997)

References:

American Peony Society: International Cultivar Registration Authority for the genus.

<https://americanpeonysociety.org/cultivars/peony-registration-info/> accepts over 7.000 registered cultivars

Burkhardt C (2025) Web Project *Paeonia*. https://www.paeon.de/navigation/hilf_hyb_fs.html
many more crosses than listed above

Hong D-Y (2021) Peonies of the world. Part III: Phylogeny and evolution. Kew Publishing: Royal Botanic Gardens Kew, pp. 215–222.

Kutzelnigg H (2025) Der Grundtyp der Pfingstrosen (Familie Paeoniaceae). Studium Integrale J. 32, 39–43. <https://si-journal.wort-und-wissen.org/sij/article/view/4277> =[Peonies – a basic type (family Paeoniaceae)]

Peony Society <https://www.peonysociety.eu/>

Punina EO et al. (2012) Interspecific hybridization in the genus *Paeonia* (Paeoniaceae): Polymorphic sites in transcribed spacers of the 45S rRNA genes as indicators of natural and artificial peony hybrids. Russian J. Genetics 48 (7), 684–697.

Smith D (1997) Peony intersectional crosses; A brief review of the progress of the first 50 years. *Paeonia* 27 (2), 6–9.

<http://www.i-hybridpeonies.com/paeonia/id2.html> “intersectional” hybrids

Papaveraceae (Ranunculales) 48: 2022

poppy family = Mohnengewächse

4 subfamilies:

Fumarioideae 19: 630, Hypecooideae 1: 18, Papaveroideae 27: 350, Pteridophylloideae 1: 1.

Passifloraceae (Malpighiales) 27: 1035

passionflower family = Passionsblumengewächse

4 subfamilies:

Malesherbioideae 1: 27, Turneroideae 12: 233, Pibirioideae 1: 1, Passifloroideae 17: 706.

Passifloroideae 16: 750

3 tribes: Jongkindieae 1: 1 *Paropsieae* 5: 22, *Passifloreae* 10: 725.

Passifloreae 10: 725

Adenia 100, *Passiflora* 570, ...

Probably the species of **genus *Passiflora*** (570) belong to the same basic type, due to its unique floral structure and several hundreds of interspecific hybrids. No connections are yet known to the rest of the tribe, so it is open if more genera belong to this basic type.

IS: This is an interesting situation: POWO (2026) lists only 2 *IS*. But the British website reports “many *IS*” <https://www.passionflow.co.uk/passiflora-cultivars-hybrids/>: and the Italian website of Maurizio Vecchia lists more than one thousand hybrids in the National Italian *Passiflora* Collection. <https://www.passiflora.it/what-hybrids-are-and-how-we-can-realize-them/>. But – typical for horticultural hybrid lists – in many of the entries the partners themselves are hybrids or of unknown origin or only varieties of an already listed hybrid.

Philesiaceae s.str. (Liliales) 2: 2. 1 IG

Chilean bellflowers = Chileglöckchengewächse

Lapageria l. rosea, *Philesia l. magellanica*.

Lapageria is the national flower of Chile.

Basic type family Philesiaceae (2: 2): the two monospecific genera are connected by hybridization.

Lapageria rosea × *Philesia magellanica* (= *buxifolia*) (→ × *Philageria* Masters 1872; art. hyb., raised 1872 by Veitch and Sons in Chelsea; it is one of the first known intergeneric hybrids outside Orchidaceae) Knobloch 1972, Willis 1985, IPNI 2011

Piperaceae 5: 3630

pepper family = Pfeffergewächse

3 subfamilies:

Piperoideae 2: 3550 *Peperomia* 1380, *Piper* 2170.

Verhuellioideae 1: 3.

Zippelioideae 2: 6.

The **Piperaceae family** is interesting for basic type studies, because it consists mainly of two extremely large genera. But hybrids are very rare.

IS: POWO (2026): *Peperomia* 1 IS, *Piper* 0 IS. In horticulture much more hybrids are known in *Peperomia*, cf.

https://www.reddit.com/r/peperomia/comments/lc981l/do_hybrid_peperomia_really_exist_in_cultivation/ and *Piper*,

https://www.reddit.com/r/peperomia/comments/lc981l/do_hybrid_peperomia_really_exist_in_cultivation/

Plantaginaceae (incl. Callitrichaceae, Globulariaceae, Scrophulariaceae p.p.) (Lamiales) 90: 1900. (1 IG)

plantain family = Wegerichgewächse

This family has been much enlarged in the last decades. It is morphologically very heterogeneous.

12 tribes:

Antirrhineae 27: 400, Callitricheae 2: 76, Digitalideae 2: 24, Globularieae 3: 42, Digitalideae 2: 24, Gratioleae 30: 300, Plantagineae 2: 290, Veroniceae 10: 525, ...

Antirrhineae 27: 400. 1 IG

Lophospermum × *Mabrya* *Maurandyinae* (art. hyb.) Elisens 1989

Digitalideae 2: 24

Digitalis 20 (incl. *Isoplexis*°), *Erinus* 2.

Digitalis × *Isoplexis*° (*Digitalis*) IS (→ × *Digiplexis* ined.) (*D. purpurea* × *Isoplexis*° *canariensis*), many photos in internet!

Globularieae 3: 42

Globularia sarcophylla × *Lytanthus*° *salicinus* (= *Globularia salicina*) IS (→ × *Lytanthobularia* 1960 Sventenius Addit. Fl. Canar. 1, 57, nat. hyb.) IK 1966, Knobloch 1972

Veroniceae 10: 525

Formerly part of Scrophulariaceae.

The number of genera has changed repeatedly and is still a matter of debate.

Kashmiria 1, *Lagotis* 20, *Neopicrorhiza* 1, *Paederota* 2, *Picrorhiza* 1, *Scrofella*, *Veronica* 450 (incl. *Besseyia*°, *Derwentia*°, *Hebe*°, *Pseudolysimachion*°, *Synthyris*°, ...), *Veronicastrum* 13, *Wulfenia* 2, *Wulfeniopsis* 1.

Probably **basic type Plantaginaceae tribe Veroniceae genus *Veronica*** (1: 450) as a well-defined monophyletic taxon (see Albach et al. 2004) with many interspecific hybrids.

POWO (2024): *Veronica* 32 IS.

Besseyia° *rubra* (*Veronica*) × *Synthyris*° (*Veronica*) *missurica* IS Kruckeberg & Hedglin 1963 (nat. hyb. in North America), Knobloch 1972

References:

Albach D et al. (2004) A new classification of the tribe Veroniceae: problems and a possible solution. Taxon 53, 429–452. doi:10.2307/4135620

Elisens WJ (1989) Patterns of crossability and interfertility in subtribe Maurandyinae (Scrophulariaceae-Antirrhineae). Syst. Bot. 14, 304–315.

Kruckeberg AR & Hedglin (1963) Natural and artificial hybrids of *Besseyia* and *Synthyris* (Scrophulariaceae). Madrono 17, 109–115.

Platanaceae (Proteales) 1: 10

plane-tree family = Platanengewächse

Platanus 10.

2 subgenera: *Castaneophyllum* 1 *kerrii*, *Platanus* 9.

Probably **basic type family Platanaceae** (1: 10). A distinct, monogeneric family.

IS: POWO (2026): *Platanus* 1 IS (*occidentalis* × *orientalis*).

Poaceae (= Gramineae) (Poales) 800: 11800. (108 IG + 26 IST)

grass family = Süßgräser

The subdivision of Poaceae is still matter of debate. AP website links to Soreng et al. last revised 2022 <https://www.tropicos.org/docs/meso/WORLDWIDE%20CLASSIFICATION%20OF%20POACEAE%20TROPICOS%20version%20APR%2028%202022.htm>

12 subfamilies:

Anomochlooideae 2: 4, Aristidoideae 3: 367, Arundinoideae 16: 36, Bambusoideae 115: 1640, Chlorioideae 130: 1700, Danthonioideae 18: 292, Micrairoideae 9: 182, Oryzoideae 18: 119, Panicoideae 242: 3325, Pharoidaeae 3: 12, Pooideae 219: 4126, Puelioideae 2: 11,

A compilation of interspecific and intergeneric hybrids has been presented by Knobloch 1968, but this list is neither critical nor actual.

Bambusoideae 115: 1640

3 tribes:

Arundinarieae (temperate woody bamboos) 33: 550, Bambuseae (tropical woody bamboos) 63: 784, Olyreae (herbaceous bamboos) 24: 124.

Arundinarieae 33: 550. 2 IG

5 subtribes.

Arundinaria × *Sasa* *Arundinariinae* (→ × *Sasinaria* Demoly 1995 Bambou 21: 15) IK 1995

Bambusa pervariabilis × *Dendrocalamus latiflorus* × *Phyllostachys pubescens* IT **Bambuseae** × **Bambuseae** × **Arundinarieae** (trigeneric) Rao 1987. unconfirmed
Bambusa × *Phyllostachys* IT **Bambuseae** × **Arundinarieae** Rao 1987. unconfirmed.
Phyllostachys × *Sasa* **Arundinariinae** (→ × *Phyllosasa* Demoly 1995 Bambou 21: 14) **HY** IK 1995, Triplett et al. 2010 (nat. hyb., *P. nigra* ‘Henon’ × *S. veitchii* (→ × *Phyllosasa tranquillans*) (= „*Hibanobambusa*° *tranquillans*, “*Semiarundinaria*” × *transquillans*) POWO 2026

Bambuseae 49: 825. **3 IG**

Diverse clade. 11 subtribes.

For a putative hybridogeneous origin of the Bambuseae taxa *Sasa*, *Pleioblastus*, *Phyllostachys* and *Sasamorpha* (i. e., all the major lineages found in Japan), see Triplett et al. 2010, for further literature see Triplett et al. 2014

~~*Bambusa* × *Saccharum*~~ ISF **Bambusoideae** × **Panicoideae** Knobloch 1972 → no hybrid, apomict of *Saccharum*, see Clayton & Renvoize 1986, Watson 1990

Bambusa × *Dendrocalamus* **Bambusinae** Zhang & Cheng 1980, Rao 1987

Bambusa pervariabilis × *Dendrocalamus latiflorus* × *Phyllostachys pubescens* IT **Bambuseae** × **Bambuseae** × **Arundinarieae** (trigeneric) Rao 1987. unconfirmed

Bambusa × *Phyllostachys* IT **Bambuseae** × **Arundinarieae** Rao 1987. unconfirmed.

Dendrocalamus × *Gigantochloa* **Bambusinae** (→ × *Gigantocalamus* K. M. Wong 2011 Gard. Bull. Singapore 62 (2): 234) IPNI 2011, Goh et al. 2011 (nat. hyb.)

Dendrocalamus × *Thyrsostachys* **Bambusinae** (→ × *Thyrsocalamus*) van der Meer 2019

Chloridoideae 130: 1700. **1 IG**

5 tribes.

Chloris × *Cynodon* **Cynodonteae** **Eleusininae** (→ × *Cynochloris* Clifford & Everist 1964 in Proc. Roy. Soc. Queensland 75, 46) Knobloch 1968, IK 1970, Clayton & Renvoize 1986, Watson 1990

Leptochloa fusca × *Oryza sativa* ISF **Chloridoideae** **Cynodonteae** × **Oryzoideae** **Oryzeae** Farooq & Naqvi 1987 (sex. art. hyb., hybridity confirmed through mitotic analysis of root tips) → **confirmation needed!**

Danthonioideae 17: 281

1 tribe: Danthonieae.

Danthonia alpina = *calycina* × *Sieglingia*° (*Danthonia*) *decumbens* IS (→ × *Danthosieglingia* Domin 1935 in Preslia 13–15, 39; nat. hyb. in Southern Europe; = *Danthonia* × *semiaristata*) IK 1938, Knobloch 1968, Clayton & Renvoize 1986, Conert 1998

Oryzoideae 18: 119

4 tribes.

Oryzeae 11: 72. **1 IG**

Leersia 20, *Oryza* 20, *Zizania* 4, ...

Leersia perrieri × *Oryza sativa* **Oryzinae** EC Ballesfin et al. 2018

Leersia × *Oryza* → **asymmetric AS**, no true hybrids. Katayama 1995

Oryza × *Pennisetum* ISF **Oryzeae** × **Panicoideae** → **questionable**, though cytologically investigated. Knobloch 1968

Oryza sativa × *Porteresia*° (*Oryza*) *coarctata* **Oryzinae** IS Jena 1994 EC SO Jelodar et al. 1999

Oryza × *Sorghum* ISF **Oryzeae** × **Panicoideae** (→ × *Sorghyza* M. van der Meer 2019) only partially symmetric. Li & Tang 1992, Tang 1998, Tang et al. 2002

Oryza × *Triticum* **ISF** **Oryzeae** × **Triticeae** → **asymmetric** (→ × *Oryticum* C. P. Wang & S. H. Tang 1982 in Acta Phytotax. Sin. 20, 179) IK 1987, Ahokas (1993: „no real introgressed fragments from wheat genome could be shown.”)
Oryza × *Zizania* **AS** → **asymmetric** Wang et al. 2005

Panicoideae 242: 3325

12 tribes:

Andropogoneae 91: 1200, Paniceae 84: 1500, ...

Andropogoneae 91: 1200. **11 IG** (incl. **4 IST**)

C4-plants. Incl. Maydeae.

12 subtribes.

en.wikipedia 2024: Hybridization was probably important in the evolution of the Andropogoneae.

cf. <https://www.google.com/patents/US8362329> = *Saccharum* × other Poaceae

Andropogon × *Saccharum* **IST** **Andropogoninae** × **Saccharinae** Knobloch 1968

Bothriochloa × *Capillipedium* **Anthistiriinae** **HY** DeWet et al. 1961, DeWet & Harlan 1966, Knobloch 1968, Clayton & Renvoize 1986, Watson 1990

Bothriochloa × *Dichanthium* **Anthistiriinae** **HY** Celarier et al. 1961, Harlan & Chheda 1961, DeWet & Harlan 1966, Knobloch 1968, Clayton & Renvoize 1986, Watson 1990

Erianthus[°] (*Saccharum*) × *Saccharum* **IS** **Saccharinae** Knobloch 1968, Clayton & Renvoize 1986, Watson 1990, D'Hont et al. 1995, Besse et al. 1997, Park et al. 2011, etc.,

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0324128>

Eriochrysis × *Saccharum* **incertae sedis** × **Saccharinae** Clayton & Renvoize 1986

Euchlaena[°] (*Zea*) × *Zea* **IS** **Tripsacinae** (→ × *Euchlaeza* Janaki ex Bor. 1960, Grasses Burma, Ceyl., India & Pakist., 266–267, art. hyb.) IK 1966, Knobloch 1968, WI 1985, Watson 1990, Clayton & Renvoize 1986

Eulalia × *Saccharum* **IST** **Apludinae** × **Saccharinae** Clayton & Renvoize 1986

Eulalia × *Sorghastrum* **Apludinae** Knobloch 1968

Hordeum × *Pennisetum*[°] (*Cenchrus*) **IT** **Triticeae** × **Maydeae** embryo formation Zenkteler & Nitzsche 1984

Imperata × *Saccharum* **IST** **Germainiinae** × **Saccharinae** (→ × *Imparum* M van der Meer 2019) Gupta et al. 1978, Knobloch 1968, Clayton & Renvoize 1986, Watson 1990, van der Meer 20219

Miscanthidium (“*Miscanthus*”) × *Saccharum* **Saccharinae** Watson 1990

Miscanthus div. spec. × *Saccharum* **Saccharinae** (→ × *Miscarum* M. van der MEER 2019) Gupta et al. 1978, Knobloch 1968, Clayton & Renvoize 1986, Watson 1990, Park et al. 2011

Miscanthus × *Triarrhena*[°] (*Miscanthus*) **IS** **Saccharinae**

<http://www.miscanthus.de/zuechtung/sortengruppen.htm>

Narenga[°] (*Miscanthus*, “*Saccharum*”) × *Saccharum* **Saccharinae** Janaki-Ammal 1942, Watson 1990, etc.

Narenga[°] (*Miscanthus*, “*Saccharum*”) × *Sclerostachya*[°] (*Miscanthus*) **IS** **Saccharinae** Watson 1990

Pennisetum[°] (*Cenchrus*) × *Zea* **IT** **Paniceae** × **Andropogoneae** **Tripsacinae** Nitsch et al. 1985
confirmation needed

Saccharum × *Sclerostachya*[°] (“*Miscanthus*”) **Saccharinae** Nataraja BV & Rao JT 1970, Sreenivasan & Sreenivasan 1984a, Watson 1990

Saccharum × *Sorghum* **IST** **Saccharinae** × **Sorghinae** (→ × *Sorgharum* M. van der Meer 2019) Gupta et al. 1978), Knobloch 1968, Sreenivasan & Sreenivasan 1984 b, Clayton & Renvoize 1986, Watson 1990, Nair 1999, Sobhakumari & Nair 2007, Hodnett et al. 2009

Saccharum × *Zea* **IST** **Saccharinae** × **Tripsacinae** → (→ × *Zearum* M. van der Meer 2019) Gupta et al. 1978, questionable, see Watson 1990

Secale × *Zea* **IT** **Triticeae** × **Tripsacinae** only embryo formation Zenkteler & Nitzsche 1984

Sorghum × *Zea* **IST Sorghinae × Tripsacinae** Bates et al. 1975, Belea 1992 → questionable, see Sreenivasan & Jalaja 1982

Tripsacum^o (*Zea*) × *Panicum* **IT Andropogoneae Tripsacinae × Paniceae** Williams-Cameron 1966, Belea 1992 questionable

Tripsacum (*Zea*) × *Zea* **Tripsacinae** (→ × *Trizea*^o M. van der Meer 2019) Bernard & Jewell 1985, Clayton & Renvoize 1986, Watson 1990, von Buelow et al. 1994, see also Talbert et al. 1990 (hybridogeneous origin HY of *Tripsacum andersonii*)

Paniceae 84: 1500

7 subtribes.

Antheophora × *Digitaria* **Antheophorinae** (→ *Tarigidia*) → **HY** = according to Watson 1990 the genus *Tarigidia* is possibly the result of spontaneous intergeneric hybridism

Cenchrus ciliaris × *Pennisetum*^o *glaucum* (*Cenchrus glaucus*) **IS Cenchrinae** Read & Bashaw 1974

Hordeum × *Pennisetum* **IT Triticeae × Paniceae** embryo formation Zenkteler & Nitzsche 1984

Pennisetum × *Zea* **IT Paniceae × Andropogoneae** Nitsch et al. 1985 confirmation needed

Pooideae 219: 4126

15 tribes.

Bromeae 1: 165

Bromeae are related to Triticeae and Littledaleae 4.

Bromus (incl. *Anisantha*^o).

Agropyron repens × *Bromus inermis* **IT Triticeae × Bromeae** (→ „× *Agromus*”) probably **asymmetric** Gyulai et al. 1992, Mazik-Tokei et al. 1995

Bromus × *Festuca* **IT Bromeae × Poeae** confirmation needed (→ × *Bromofestuca* Prodan 1936/1937 in Bull. Grad. Muz. Bot. Univ. Cluj 16, 93) IK 1947, Knobloch 1968, Clayton & Renvoize 1986, Watson 1990, Watson et al. 1992 onwards: „supposed“ (*B. erectus* × *F. arundinacea*)

Bromus × *Triticum* **IT Bromeae × Triticeae** asymmetric **AS** Xiang et al. 1999

Poeae (incl. Festuceae) 121: 2900. 20 IG (incl. 7 IST

Rispengras-Verwandte

38 subtribes.

Agrostis 220 (incl. *Ammophila*^o), *Aira*, *Alopecurus*, *Anthoxanthum* 50, *Avena*, *Avenella*, *Calamagrostis* 130, *Dactylis*, *Holcus*, *Deschampsia*, *Festuca*, *Lolium* (often incl. *Festuca* subgen. *Schenodorus*^o)

Phalaris, *Poa* 617, *Polypogon* 22, *Sesleria* 40, *Trisetum*, ...

Possibly basic type Poaceae Pooideae tribe Poeae (121: 2900). 13 IG + 7 IST. Further studies are necessary to confirm this assumption.

Agrostis alpina, *rupestris*, *stolonifera* × „*Calamagrostis*“ *tenella* (= *Agrostis schraderiana* = *agrostiflora*) **IS Agrostidinae** (→ × *Agrocalamagrostis* 1899 Aschers. & Graebn. Syn. Mitteleur. Fl. 2, 1. 223) IK 1970, Knobloch 1968, Clayton & Renvoize 1986, Conert 1998, Watson 1990 → these plants are interspecific hybrids of *Agrostis* as delimited today

Agrostis **div. spec. × Polypogon div. spec. Agrostidinae** (→ × *Agropogon* P. Fournier 1934 Quatre Fl. France, 50, in clavi; P. Fournier 1935 in Le Monde des Plantes 36 (213), 20; = × *Polypogonagrostis*^o (Asch. & Graebn.) Maire & Weiller 1953 Fl. Afr. Nord 2, 151; a number of natural hybrids in Europe and Africa) IK 1938, IK 1950, IK 1959, Knobloch 1968, Conert 1998, Watson 1990, ST 1995, Czerepanov 1995 (nat. hyb. in Middle Asia)

Alopecurus × *Hordeum* **IT Poeae × Triticeae** embryo formation Zenkteler & Nitzsche 1984

Alopecurus × *Triticum* **IT Poeae × Triticeae** embryo formation Zenkteler & Nitzsche 1984

Ammophila^o (*Calamagrostis*) *arenaria* × *Calamagrostis epigejos* **IS Agrostidinae** (→ × *Calammophila* A. Brand 1907 in Koch, Syn. Deutsch. Schweiz. Fl., ed. 3, 3, 2715, = „× *Ammocalamagrostis*“ P. Fournier 1934 in Le Monde des Plantes 35, 28, = „× *Calamophila*“ O. Schwarz 1949 in Mitt. Thüring. Bot. Ges. 1, 88; nat. hyb. on European coasts, long known) IK 1938, Knobloch 1968, Clayton & Renvoize 1986, Conert 1998, Watson 1990, Czerepanov 1995

Arctophila fulva × *Dupontia (fisheri subsp.) psilosantha* **Dupontiinae** (→ × *Arctodupontia* Tzvelev 1973 in Novosti Sist. Vyssh. Rast. 10, 91) (nat. hyb. in Eastern Europe and Soviet Far East) IK 1981, Watson 1990, Clayton & Renvoize 1986, Czerepanov 1995

Arctopoa (= *Poa*) *eminens* × *Dupontia* **IST Poinae × Dupontiinae** (→ × *Dupontopoa* Prob. 1984 Bot Zhurn. (Moscow & Leningrad) 69 (5): 689; = × *Duarctopoa* Sorenq & L. J. Gillespie 2008 Botany 86 (6): 965) IPNI 2011, Watson & Dallwitz 1992 onwards, see also *Dupontia* × *Poa*

Arrhenatherum elatius × *Avenochloa* (= *Helictotrichon*) *pubescens* **Aveninae** Knobloch 1968

Bromus × *Festuca*: see Bromeae

Catabrosa × *Puccinellia* **Coleanthinae** (→ × *Catanella*) POWO 2026

Colpodium vahlium × *Phippsia algida* **Coleanthinae** (→ *Puccinellia vacillans* = *Catabrosa concinna*) Hedberg 1962 (**HY** = hybridogeneous origin)

Cynosurus × *Dactylis glomerata* **IST Cynosurinae × Dactylinae** Knobloch 1968, Otto 2003

Cynosurus × *Lolium* **IST Cynosurinae × Loliinae** (art. hyb.) Otto 2003

Dactylis × *Festuca* × *Lolium* **IST Dactylinae × Cynosurinae** (trigeneric) Otto 2003

Dactylis × *Secale* **IT Poeae × Triticeae** (only embryo formation) Zenkteler & Nitzsche 1984

Dactylis × *Triticum* **IT Poeae × Triticeae** (only embryo formation) Zenkteler & Nitzsche 1984

Dactylis glomerata × *Festuca* **IST Dactylinae × Loliinae** Matzk et al. 1980, Matzk 1981, Otto 2003

Dactylis glomerata × *Lolium multiflorum* **IST Dactylinae × Loliinae** (symmetric hybrid) Oertel et al. 1996, Oertel & Matzk 1998, Otto 2003, Toshinori et al. 2010

Dupontia (fisheri subsp.) psilosantha × “*Poa*” (= *Arctopoa*) *eminens* **Poinae** (→ × *Dupontopoa*^o N. S. Probatova 1984 in Bot. Zhurn. 69, 689; = × *Dupoa* Cayouette & Darbyshire 1993 in Nordic J. Botany 13, 615–629; nat. hyb.) IK 1987, Darbyshire et al. 1992, Cayouette & Darbyshire 1993 (**HY**: “*Poa*”(*Duarctopoa*) *labradorica* is interpreted to be of intergeneric hybridogeneous origin *D. fisheri* × *P. eminens*), Czerepanov 1995 (*Dupontopoa dezhevii*, nat. hyb. in Soviet Far East). cf. *Arctopoa* × *Dupontia*

Dupontia × *Puccinellia* **IST Dupontiinae × Coleanthinae** Tzvelev 1984

Festuca × *Secale* **IT Poeae × Triticeae** embryo formation Zenkteler & Nitzsche 1984

Festuca subgen. *Schedonorus* div. spec. × *Lolium* div. spec. **Loliinae** (→ × *Festulolium* Asch. & Graebn. 1902 in Syn. Mittel-Europ. Fl. 2 (1), 768) (at least 7 natural hybrids in Europe etc.; the longest known grass hybrid is *Festuca pratensis* × *Lolium perenne*, reported by Curtis as early as 1777 in Flora London 6, pl. 9) Jenkin 1933, IK 1933, Knobloch 1968, Xu & Sleper 1994, Stace 1995, Czerepanov 1995. Please note that subgenus *Schedonorus* has been transferred to *Lolium* so that all hybrids of this type are now interspecific.

Festuca div. spec. × *Vulpia* div. spec. **Loliinae** (→ × *Festulpia* Melderis ex Stace & R. Cotton 1974 in Watsonia 10, 136) (nat. hyb. + art. hyb.) Knobloch 1968, IK 1981, WI 1985, Ainscough et al. 1986, Watson 1990, Stace 1995 (2 nat. hyb. in Western Europe), Conert 1998 (many references on hybrids), Krahulec & Nesvadbová 2007 nat. hyb. *F. rubra* × *V. myuros* in the Czech Republic), *Vulpia* is sometimes included in *Festuca*

Hainardia × *Parapholis* **Parapholiinae** (→ × *Hainardiopholis* S. Catroviejo 1979 publ. 1980 in An. Inst. Bot. A. J. Cavanilles 36, 238) IK 1987

Helictotrichon × *Trisetopsis* **Aveninae** (→ × *Trisetopsotrichon*) Woelk & Roeser (= *H. altius*, nat. hyb. China), POWO 2026

Hordeum × *Lolium* **IT Poeae × Triticeae** embryo formation Zenkteler & Nitzsche 1984

Koeleria asiatica × *Trisetum* div. spec. **Aveninae** (→ × *Trisetokoeleria* Tzvelev 1970 publ. 1971 in Novosti Sist. Vyssh. Rast. 7, 73; nat. hyb.) Knobloch 1968, IK 1981, Clayton & Renvoize 1986, IK 1987, Watson 1990, Czerepanov 1995 (nat. hyb. in the former USSR)

Koeleria asiatica × *Sibirotrisetum litorale* **Aveninae** (→ × *Sibirotrisetokoeleria*) (nat. hyb.) POWO 2026.

Lolium × *Schedonorus*^o (*Festuca* p.p.) **IS Loliinae** (→ × *Schedolium* Holub 1998 Preslia 70 (2): 111; = × *Schedololium* Soreng & Terrell 1997 (publ. 1998) Phytologia 83 (2): 86) Soreng & Terrell 1997, IK 1998. identical with *Festuca* subgen. *Schedonorus* (= *Lolium* p.p.) × *Lolium*, see above

Lolium × *Triticum* **IT Poae × Triticeae AS asymmetric** Ge et al. 2002

Phalaris aquatica × *Typhoides*^o (*Phalaris*) **arundinacea IS Phalaridinae** Knobloch 1968, Clayton & Renvoize 1986, Conert 1998

Phippsia × *Puccinellia* div. spec. **Coleanthinae** (nat. hyb.) (→ × *Pucciphippsia* Tzvelev 1971 in Novosti Sist. Vyssh Rast. 8, 76; = „× *Maltea*“ B. Boivin 1967 in Natur. Canad. 94, 526 nom. illegit.) Knobloch 1968, IK 1974, IK 1981, WI 1985, Clayton & Renvoize 1986, Watson 1990, Czerepanov 1995 (nat. hyb. in Eastern Europe and Soviet Far East)

Sphenopholis obtusata × *Trisetum pensylvanicum* **Aveninae** (nat. hyb.) Terrell et al. 1965, Knobloch 1968, Watson 1990

Stipeae 32: 600. 1 IG

Achnatherum 20, *Eriocoma* 27, *Nassella* 122, *Oryzopsis* 8, *Stipa* 300, ...

Attention: the synonymy is extremely confusing, e.g. numerous species once regarded as members of *Oryzopsis* (a genus that still exists) have been shifted into 10 other genera! So, the three nothogenera × *Achnella*, × *Eriosella* and × *Stiporyzopsis* are synonyms!

IS: POWO (2026): *Nassella* 0 **IS**, *Stipa* s.str. 29 **IS**, ...

Achnatherum (= *Oryzopsis* = *Stipa* = *Eriocoma*) *hymenoides* × *Nassella viridula* (→ × *Achnella* (*caduca*) Barkworth 1993 in Phytologia 74, 15; = × *Stiporyzopsis* B. L. Johnson & Rogler 1943 in Amer. J. Bot. 30, 55; = *Oryzopsis caduca*; nat. hyb. in North America → × *Eriosella* (*caduca*), see below) Knobloch 1968, Clayton & Renvoize 1986, Watson 1990, IK 1996. See *Eriocoma* × *Nassella*

Eriocoma × *Nassella* (→ × *Eriosella* (*caduca*) Romasch. 2019 PhytoKeys 126: 106; *E. hymenoides* × *N. viridula*, nat. hyb.) Peterson et al. 2019, POWO 2026.

Eriocoma × „*Stipa*“ (*Eriocoma*) **IS** (nat. hyb.) Johnson 1963 (*E. hymenoides* × *E. pinetorum*), Spellenberg & Mehlenbacher 1971 (*E. hendersonii* × *E. lemmonii*) → now thought to be interspecific within *Eriocoma* (Peterson et al. 2019)

“*Oryzopsis*” (= *Achnatherum*) *hymenoides* × “*Stipa*” (*Nassella*) *viridula* (→ × *Stiporyzopsis*^o B. L. Johnson & Rogler 1943 in Amer. J. Bot. 30, 55. see *Eriocoma* × *Nassella*)

Triticeae 27: 500. 96 IG (incl. 15 IST)

wheat-grasses = Weizen-Verwandte

2 subclades: *Triticum* subclade: *Aegilops*, *Amblyopyrum*, *Dasypyrum*, *Triticum*.

The rest: *Elymus* 150, *Hordeum* 30, *Leymus* 30, *Roegneria* 130,

Basic type family Poaceae Pooideae tribe Triticeae (27: 500): Junker 1993. Well documented as a basic type: all genera are closely related and nearly all of them are linked by some 96 intergeneric hybrids, including some 15 intergeneric hybrids which link the two subtribes, as far as they are distinguished. No confirmed true hybrids connecting other tribes exist. – Possibly the closely related monogeneric tribe Bromeae is part of the basic type, but the known hybrids are asymmetric.

Aegilops × *Amblyopyrum*^o *muticum* (= *Aegilops mutica*) **IS** Knobloch 1968, Junker 1993

Aegilops × *Dasypyrum* Watson & Dallwitz 1992 onwards

Aegilops × *Elytrigia*^o (*Elymus*) **IST** Watson & Dallwitz 1992 onwards

Aegilops × *Eremopyrum* **IST** Sakamoto 1968

Aegilops × *Hordeum* × *Secale* **IST** Cabrera & Martin 1992

Aegilops × *Secale* **IST** (→ × *Aegilosecale* Cif. & Giacom. 1950 Nomencl. Fl. Ital., Pt. 1, 180) IK 1974

Aegilops × *Secale* × *Triticum* IST Cabrera & Martin 1992
Aegilops × *Taeniatherum* IST Schooler 1966 (*Aegilops* × „*Elymus*“ caput-medusae), Frederiksen & von Bothmer 1989
Aegilops × *Thinopyrum* IST Junker 1993
Aegilops × *Triticum* (→ × *Aegilotriticum* Wagner ex Tschermak 1926 Ber. Deutsch. Bot. Ges. 44: 113; P. Fourn. 1935 Quatre Fl. France, 89; = × *Aegilotrichum*° G. Camus 1927 in Bull. Mus. Hist. Nat. Paris 33, 538) IK 1933, IK 1950
Agropyron × *Elymus* (→ × *Agroelymus* E. G. Camus ex A. Camus 1927 Bull. Mus. Hist. Nat. Paris 33, 538) IK 1933 (nat. hyb. + art. hyb.). see *Agropyron* × *Thinopyrum*
Agropyron × *Elytrigia*° (= *Elymus* p.p.) (→ × *Agrotrigia* Tzvelev 1972 in Novosti Sist. Vyssh. Rast. 9, 63) IK 1981, Czerepanov 1995 (nat. hyb. in Eastern Europe, Caucasus and Middle Asia) (synonym of × *Agroelymus*)
Agropyron × *Eremopyrum* Sakamoto 1967, Frederiksen & von Bothmer 1995
Agropyron × *Hordeum* (→ × *Agrohordeum* E. G. Camus ex Rousseau 1952 Mem. Jard. Bot. Montreal, No. 29, 12; = × *Agropyrohordeum* E. G. Camus ex A. Camus 1934 in Riv. Scient. 21, 44; = × *Hordeopyron* Simonet 1935 in Compt. Rend. 201, 1212, in obs.) IK 1933, IK 1938, IK 1959
Agropyron × *Leymus* (→ × *Leymopyron* Tzvelev 1974 in Fl. Severo-Vostoka Evropeiskoi Chasti SSSR 1, 121) IK 1981
Agropyron × *Psathyrostachys* Jensen & Bickford 1992
Agropyron × *Pseudoroegneria* Wang et al. 1985, Assadi & Runemak 1995
Agropyron × *Secale* Wang 1997, Watson & Dallwitz 1992 onwards
Agropyron × *Secale* × *Triticum* (→ × *Agrotrisecale* Cif. & Giacom. 1950 Nomencl. Fl. Ital., Pt. 1, 48) IK 1974, Gupta & Fedak 1986
Agropyron × *Sitanion*° (= *Elymus* p.p.) (→ × *Agrositanion* Bowden 1967 in Canad. Journ. Bot. 45, 720; confer × *Agrositanion* subgen. *Zingrostis* G. L. Pyrah 1983 in Great Basin Nat. 43, 135 – U.S.A. (Arizona)) IK 1974, IK 1991
Agropyron × *Taeniatherum* Frederiksen & von Bothmer 1989
Agropyron cristatum × *Thinopyrum intermedium* (→ × *Agrothinopyrum* Liu et Liu) Feng et al. 2024
Agropyron × *Triticum* (→ × *Agrotriticum* Cif. & Giacom. 1950 Nomencl. Fl. Ital., Pt. 1, 48) White 1940, IK 1974
Agropyron repens (Triticeae) × *Bromus inermis* IT Triticeae × Bromaeae asymmetric? Gyulai et al. 1992, Mazik-Tokei et al. 1995
Amblyopyrum° *muticum* (= *Aegilops* p.p.) × *Secale* IST Knobloch 1968, Junker 1993 (*Amblyopyrum*° is a separate genus in Watson and Dallwitz 1992 onwards)
Amblyopyrum° *muticum* (= *Aegilops* p.p.) × *Triticum* Knobloch 1968, Junker 1993
Bromus × *Triticum* IT Bromaeae × Triticeae SO asymmetric AS Xiang et al. 1999
Campeiostachys° (*Elymus*) × *Hordeum* (→ × *Campeiordeum* Z. H. Feng et Su Liu) Feng et al. 2024POWO 2026
Campeiostachys° (*Elymus*) × *Kengyilia* (→ × *Campeiyilia*) POWO 2026
Critesion° (= *Hordeum* p.p.) × *Elymus* (→ × *Elytesion* Barkworth & D. R. Dewey 1985 Amer. J. Bot. 72 (5): 772) IPNI 2011
Critesion° (= *Hordeum* p.p.) × *Elytrigia*° (= *Elymus*) (nat. hyb.) McIntyre 1988
Critesion° (= *Hordeum* p.p.) × *Leymus* (→ × *Leytesion* Barkworth 1984 in Amer. J. Bot. 71, 623) IK 1987, see also *Hordeum* × *Leymus*
Critesion° (= *Hordeum* p.p.) × *Pseudoroegneria* Asay et al. 1987
Critesion° (= *Hordeum* p.p.) × *Thinopyrum* Wang 1986
Dasypyrum × *Elytrigia*° (*Elymus*) IST Junker 1993
Dasypyrum × *Eremopyrum* IST Frederiksen & von Bothmer 1995
Dasypyrum × *Psathyrostachys* × *Triticum* IST Sun et al. 1995c
Dasypyrum × *Secale* IST Nakajima 1971
Dasypyrum × *Taeniatherum* IST Frederiksen & von Bothmer 1989
Dasypyrum × *Thinopyrum* IST Junker 1993

Dasypyrum × *Triticum* (→ × *Dasyticum* Su Liu et Bing Liu) von Bothmer & Claesson 1990, Genlou et al. 1995, Feng et al. 2024, POWO 2026, see also *Haynaldia*^o (= *Dasypyrum* p.p.) × *Triticum*

Elymus div. spec. × *Elytrigia*^o (= *Elymus*) div. spec. **IS** (→ × *Elymotrigia* Hylander 1953 in Bot. Notiser 1953, 358; = *Elymus*) IK 1959, Assadi & Runemark 1995, Czerepanov 1995 (nat. hyb. in Siberia and Soviet Middle Asia), IK 1996

Elymus × *Eremopyrum* Junker 1993

Elymus div. spec. × *Hordeum* div. spec. (→ × *Elyhordeum* Mansfeld ex Tsitsin & K. A. Petrova 1955 in Der Züchter 25, 164; = „× *Hordelymus*“ Bachtj. & Darevsk. 1950 in Bot. J. URSS, 35, 191, nomen illeg.; = „× *Elymordeum*“ Lepage 1957 in Natur. Canad. 84, 97, nomen superfl.) IK 1966, IK 1987, Lu et al. 1990, Czerepanov 1995 (nat. hyb. in Sibiria and Middle Asia), Conert 1998 (nat. hyb. in Great Britain and Denmark)

Elymus × *Leymus* (→ × *Elyleymus* B. R. Baum 1979 in Canad. J. Bot. 57, 947) IK 1987, Conert 1998 (nat. hyb. in Germany, *E. farctus* × *L. arenarius* and *E. repens* × *L. arenarius*), Jensen et al. 1999, (further synonyms are: × *Elymopyron*, × *Elymotrigia*, × *Leymotrigia*, × *Tritordeum*)

Elymus × *Psathyrostachys* (→ × *Elymostachys* Tzvelev 1972 in Novosti Sist. Vyssh. Rast. 9, 58) IK 1981, Czerepanov 1995 (nat. hyb. in Soviet Middle Asia)

Elymus × *Pseudoroegneria* (→ × *Pseudelymus* M. E. Barkworth & D. R. Dewey 1983 in Great Basin Naturalist 43, 570) IK 1991, Assadi & Runemark 1995

Elymus × *Secale* Heneen 1963, Lu et al. 1990

Elymus × *Sitanion*^o (*Elymus*) **IS** (→ × *Elysitanion* Bowden 1967 in Canad. J. Bot. 45, 721) IK 1974

Elymus × *Terrellia*^o (*Elymus*) **IS** (→ × *Terrelymus* B. R. Baum 1979 in Canad. J. Bot. 57, 947) IK 1987

Elymus × *Thinopyrum* (→ × *Thinoelymus*)

Elymus × *Triticum* (→ × *Elymotriticum* 1935 P. Fourn. Quatre Fl. France, 88) IK 1950

Elytrigia^o (*Elymus*) × *Hordeum* (→ × *Elytrordeum* Hylander 1953 Bot. Notiser 1953: 357) IPNI 2011

Elytrigia repens (*Elymus*) × *Leymus* div. spec. (→ × *Leymotrigia* Tzvelev 1964 in Fl. Arct. URSS, Fasc. 2, 250, in obs.) IK 1970, Czerepanov 1995 (nat. hyb. in different parts of the former Soviet Union), see also *Elymus* × *Leymus*

Elytrigia^o (*Elymus*) × *Pascopyrum* Junker 1993

Elytrigia^o (*Elymus*) × *Pseudoroegneria* Assadi & Runemark 1994

Elytrigia^o (*Elymus*) × *Secale* Junker 1993

Elytrigia^o (*Elymus*) (*Elymus*) × *Thinopyrum* Junker 1993, Assadi & Runemark 1995

Elytrigia^o (*Elymus*) × *Triticum* **IST** (→ × *Trititrigia* Tzvelev 1973 in Novosti Sist. Vyssh. Rast. 10, 59) IK 1981

Eremopyrum orientale × *Henrardia persica* Sakamoto 1972

Eremopyrum × *Heteranthelium* Sakamoto 1974

Eremopyrum × *Hordeum* Sakamoto 1974, Frederiksen & von Bothmer 1995

Eremopyrum × *Psathyrostachys* Frederiksen & von Bothmer 1995

Eremopyrum × *Taeniatherum* Frederiksen & von Bothmer 1989, 1995

Eremopyrum × *Triticum* **IST** Jianwen & Min 1996

Haynaldia^o (*Dasypyrum*) × *Secale* **IST** Sando 1935, Nakajima 1971

Haynaldia^o (*Dasypyrum*) × *Triticum* (→ × *Haynaldoticum* Cif. & Giacom. 1950 Nomencl. Fl. Ital., Pt. 1, 50; = × *Tritihaynaldia* J. Fu & S. Y. Chen 1990 in Acta Bot. Bor.-Occid. Sin. 10, 67) Sando 1935, IK 1974, IK 1991

Heteranthelium × *Hordeum* Sakamoto 1974

Hordelymus × *Hordeum* von Bothmer & Jacobsen 1989, von Bothmer et al. 1994

Hordelymus × *Secale* von Bothmer et al. 1994

Hordelymus × *Thinopyrum* Junker 1993

Hordeum × *Leymus* (→ × *Leydeum* Barkworth 1998 Phytologia 83 (4): 308) (2 nothospecies = *Critesion* × *Leymus*) Orgaard 1994, IPNI 2011

Hordeum secalinum × *Psammopyrum athericum* (→ × *Psammopyrordeum* Su Liu) Feng et al. 2024

Hordeum × *Psathyrostachys* Pickering 1987, Junker 1993

Hordeum × *Pseudoroegneria* Asayet al. 1987
Hordeum × *Roegneria*^o (*Elymus*) (→ × *Hordeoroegneria* Tzvelev 1964 in Fl. Arct. URSS, Fasc. 2, 241, in obs.; nat. hyb.) IK 1970, Czerepanov 1995
Hordeum × *Secale* (→ × *Hordale* Cif. & Giacom. 1950 Nomencl. Fl. Ital., Pt. 1, 180) IK 1974
Hordeum × *Secale* × *Triticum* Fernandez-Escobar & Martin 1989, Cabrera & Martin 1992
Hordeum × *Sitanion* (→ × *Sitordeum* Bowden 1967 in Canad. Journ. Bot. 45, 722) IK 1974
Hordeum × *Taeniatherum* Junker 1993
Hordeum × *Triticum* (→ × *Tritordeum* 1902 Asch. & Graebn. Syn. Mittel-Europ. Fl. 2 (1), 748) IK 1933
Hystris (= *Elymus* p.p.) × *Leymus* (→ × *Leymotrix* S. S. Kharkevich & N. S. Probatova 1983 in Bot. Zhurn. 68, 1408) IK 1987, Czerepanov 1995 (nat. hyb. in Soviet Far East)
Leymus × *Pascopyrum* (→ × *Pascoleymus* Barkworth 2006 Sida 22 (1): 499) Junker 1993, IPNI 2011
Leymus × *Psathyrostachys* (→ × *Leymostachys* Tzvelev 1973 in Novosti Sist. Vyssh Rast. 10, 59) IK 1981, Czerepanov 1995 (nat. hyb. in Soviet Middle Asia), Sun et al. 1995 b
Leymus × *Secale* Junker 1993
Leymus × *Secale* × *Triticum* Li et al. 2006
Leymus arenarius × *Thinopyrum junceum* (→ × *Thinoleymus* Su Liu & Bing Liu) Sun et al. 1995a Feng et al. 2024
Leymus × *Thinopyrum* × *Triticum* Mujeeb-Kazi 1996
Leymus × *Triticum* (→ × *Tritileymus*) Plourde et al. 1989, Fu et al. 1993
Lolium × *Triticum* IT *Poeae* × *Triticeae* SO asymmetric AS Ge et al. 2002
Lophopyrum^o (*Elymus* p.p.) × *Sitanion* (= *Elymus* p.p.) IS Watson et al. 1992 onwards
Lophopyrum^o (*Elymus* p.p.) × *Triticum* IST Almouslem & Amleh 1999
Lophopyrum^o (*Elymus* p.p.) × *Thinopyrum* × *Triticum* Kosina & Heslop-Harrison 1996
~~*Oryza* × *Triticum*~~ ISF *Oryzae* × *Triticeae* → asymmetric (→ × *Oryticum* C. P. Wang & S. H. Tang 1982 in Acta Phytotax. Sin. 20, 179) IK 1987, Ahokas (1993: „no real introgressed fragments from wheat genome could be shown.“)
Psathyrostachys × *Pseudoroegneria* Wang 1988 b
Psathyrostachys × *Roegneria*^o (= *Elymus* p.p.) Yen et al. 1993
Psathyrostachys × *Secale* Wang 1988b
Psathyrostachys × *Secale* × *Triticum* IST Kang et al. 2011
Psathyrostachys × *Thinopyrum* × *Triticum* Kang et al. 2012
Psathyrostachys × *Taeniatherum* Frederiksen & von Bothmer 1989
Psathyrostachys × *Thinopyrum* Sun et al. 1995a
Psathyrostachys × *Triticum* (→ × *Trys* M. van der Meer 2019) Plourde et al. 1990, Junker 1993, Genlou et al. 1995
Pseudoroegneria × *Secale* Wang 1987, 1988a
Pseudoroegneria × *Thinopyrum* Wang 1986, 1988a Assadi & Runemark 1995
Pseudoroegneria × *Triticum* Junker 1993
Secale × *Thinopyrum* Fedak & Armstrong 1986, Wang 1988a, Marais et al. 1998
Secale × *Triticum* (→ × *Triticosecale* Wittmack ex A. Camus 1927 Bull. Mus. Natl. Hist. Nat. 33: 539, cf. C. A. Stace 1987 in Taxon 36, 447; = × *Secalotriticum* Kostov) Rimpu 1890, IK 1933, 1991
Taeniatherum caput-medusae × *Triticum aestivum* Frederiksen 1994
Thinopyrum × *Triticum* Junker 1993, Jauhar 1995

References:

- Ahokas H (1993) Searching for DNA introgressed from wheat and for wheat-like grain proteins in a rice × wheat hybridization derivative. *Euphytica* 72, 177–182. [asymmetric](#)
 Ainscough MM et al. (1986) Natural hybrids between *Festuca* and species of *Vulpia* section *Vulpia*. *Watsonia* 16 (2), 143–152.
 Aitken K et al. (2007) Characterization of intergeneric hybrids of *Erianthus rockii* and *Saccharum*

- using molecular markers. *Genetic Resources and Crop Evol.* 54 (7), 1395–1405.
- Almousslem AB & Amleh N (1999) An intergeneric hybrid between durum wheat and diploid wheatgrass *Lophopyrum elongatum* (Host) A. Loeve. *Kuwait J. Science & Engineering* 26 (1), 143–155. *Triticeae Lophopyrum*° (*Elymus*) × *Triticum*
- Asay KH, Hsiao C & Dewey DR (1987) Intergeneric hybrids and amphidiploids between *Pseudoroegneria spicata* and *Critiesion violaceum*. *Botanical Gazette* 148 (1), 123–129. *Critiesion* = *Hordeum* p.p.
- Assadi M & Runemark H (1995) Hybridisation, genomic constitution and generic delimitation in *Elymus* s. l. (Poaceae: Triticeae). *Plant Syst. Evol.* 194 (3–4), 189–205.
<http://www.springerlink.com/content/u28727uq1m803276/>
- Bajaj YPS (ed) 1994 Maize. *Biotechnology in Agriculture and Forestry*. vol. 25. New York etc.: Springer.
- Ballesfin M et al. (2018) Development of an intergeneric hybrid between *Oryza sativa* L. and *Leersia perrieri* (A. Camus) Launert. *Breeding Science* 68, 474–480.
- Bates LS, Rodriques KA & Mujeeb K (1975) Immuno-suppressant effects on intergeneric hybridization of cereals. *Cereals Foods World* 20, 446.
- Belea A (1992) Interspecific and intergeneric crosses in cultivated plants. Budapest: Akademiai Kiado.
- Bernard S & Jewell DC (1985) Crossing maize (*Zea mays*) with sorghum (*Sorghum bicolor*), *Tripsacum* and Millet (*Pennisetum americanum*), the products and their level of development following pollination. *Theoretical & Applied Genetics* 70, 474–483.
- Besse P et al. (1997) Using genomic slot blot hybridization to assess intergeneric *Saccharum* × *Erianthus* hybrids (Andropogoneae –Saccharinae). *Genome* 40, 428–432.
- Bothmer R von & Claesson L (1990) Production and meiotic pairing of intergeneric hybrids of *Triticum* × *Dasypyrum* species. *Euphytica* 51 (2), 109–118.
- Bothmer R von & Jacobsen N (1989) Intergeneric hybridization between *Hordeum* and *Hordelymus*, Poaceae. *Nordic J. Bot.* 9 (2), 113–118.
- Bothmer R von, Lu B–R & Linde-Laursen I (1994) Intergeneric hybridization and c–banding patterns in *Hordelymus* (Triticeae, Poaceae). *Plant Syst. Evol.* 189, 259–266.
- Bülöw JFW von et al. (1994) Morphology and combining ability studies of maize populations recovered from the intergeneric cross *Zea* × *Tripsacum*. *Pesquisa Agropecuaria Brasileira* 29, 989–1006.
- Cabrera A & Martin A (1992) A trigeneric hybrids between *Hordeum*, *Aegilops*, and *Secale*. *Genome* 35, 647–649.
- Cayouette J & Darbyshire SJ (1993) The intergeneric hybrid grass „*Poa labradorica*“. *Nordic J. Botany* 13, 615–629.
- Celarier RP et al. (1961) Intergeneric hybrids in Bothriochloinae. 1. *Bothriochloa intermedia* and *Dichanthium annulatum*. *Cytologia* 26 (2), 170+.
- Chen C, Sleper DA & West CP (1995) RFLP and cytogenetic analyses of hybrids between *Festuca mairei* and *Lolium perenne*. *Crop Science* 35, 720–725.
- Clayton WD & Renvoize SA (1986) *Genera Graminum*. London: HMSO.
- Conert HJ (1998) *Gustav Hegi Illustrierte Flora von Mitteleuropa*. Band I, Teil 3 Poaceae. 3. Aufl. Berlin: Blackwell.
- Czerepanov SK (1995) *Vascular plants of Russia and adjacent States (the former USSR)*. Cambridge: Cambridge University Press.
- Darbyshire SJ, Cayouette J & Warwick SI (1992) The intergeneric hybrid origin of *Poa labradorica* (Poaceae). *Plant Syst. Evol.* 181, 57–76.
- DeWet JM et al. (1961) Intergeneric hybrids in Bothriochloinae. 2. *Bothriochloa* and *Capillipedium*. *Cytologia* 26 (3–4), 268+.
- DeWet JM & Harlan (1966) Morphology of the compilospecies *Bothriochloa intermedia*. *Amer. J. Bot.* 53 (1), 94–98. <http://www.jstor.org/pss/2439929>

- Dewey DR (1984) The genomic system of classification as a guide to intergeneric hybridization with the perennial Triticeae. pp. 209–279 in Gustafson JP (ed.) Gene manipulation in plant improvement. Plenum, New York.
- D'Hont A et al. (1995) Identification and characterization of sugarcane intergeneric hybrids, *Saccharum officinarum* × *Erianthus arundinaceus*, with molecular markers and DNA in-Situ hybridization. Theoretical & Applied Genetics 91, 320–326. [Andropogoneae](#).
- Farooq S & Naqvi SHM (1987) Problems and prospects of rice × kallar grass hybridization. Pakistan J. Scientific & Industrial Res. 30, 660–663. [Bambusoideae](#) [Oryzeae](#) × [Chloridoideae](#) [Chlorideae](#) s.l. ([Eragrosteae](#)) [Leptochloa fusca](#) × [Oryza](#).
- Fedak G & Armstrong KC (1986) Intergeneric hybrids between *Secale cereale* and *Thinopyrum intermedium*. Canad. J. Genetics & Cytology 28 (3), 426–429.
- Fernández-Escobar J & Martin A (1989) A self-fertile trigeneric hybrid in the Triticeae involving *Triticum*, *Hordeum* and *Secale*. Euphytica 42, 291–296.
- Frederiksen S (1994) Hybridization between *Taeniatherum caput-medusae* and *Triticum aestivum* (Poaceae). Nordic J. Botany 14, 3–6.
- Frederiksen S & von Bothmer R (1989) Intergeneric hybridization between *Taeniatherum* and different genera of Triticeae, Poaceae. Nordic J. Bot. 9, 229–240.
- Frederiksen S & von Bothmer R (1995) Intergeneric hybridizations with *Eremopyrum* (Poaceae). Nordic J. Bot. 15, 39–47.
- Fu J, Chen SY & Zhang AJ (1993) Studies of the formation and cytogenetics of octoploid *Tritileymus*. Acta Genetica Sinica 20, 317–323.
- Ge T et al. (2002) Molecular identification of asymmetric somatic hybrids between wheat and Italian ryegrass. Chinese Science Bull. 47 (24), 2093–2095.
<http://www.springerlink.com/content/a3m9774758h3366m/> [Lolium multiflorum](#) × [Triticum asymmetric](#)
- Genlou S et al. (1995) Production and cytogenetics of intergeneric hybrids between *Triticum durum* – *Dasypyrum villosum* amphidiploid and *Psathyrostachys huashanica*. Euphytica 81 (1), 7–11.
- Goh WL et al. (2011) A natural hybrid between *Dendrocalamus pendulus* and *Gigantochloa scortechinii* (Poaceae: Bambusoideae: Bambuseae) in Peninsular Malaysia.
- Gupta PK & Fedak G (1986). Intergeneric hybrids between × *Triticosecale* cv. Welsh ($2n = 42$) and three genotypes of *Agropyron intermedium* ($2n = 42$). Can. J. Genet. Cytol. 28, 176–179.
- Gupta S. et al. (1978) Morphology of *Saccharum-Sorghum* hybrid derivatives. Amer. J. Bot. 65, 936–942. e.g. [Imperata](#) × [Saccharum](#)
- Gyulai G et al. (1992) Callus initiation and plant regeneration from inflorescence primordia of intergeneric hybrid *Agropyron repens* L. Beauv. × *Bromus inermis* Leyss. cv. nanus on a modified nutritive medium. Plant Cell Reports 11 (5–6), 266–269.
<http://www.springerlink.com/content/t7751245r7058430/> [Triticeae](#) [Agropyron](#) × [Bromus](#), see also [Mazik et al. 1995](#).
- Harlan JR & Chheda HR (1961) Intergeneric hybrids in Bothriochloinae. 3. *Bothriochloa intermedia* and *Dichantium fecundum*. Amer. J. Bot. 48 (6), 546ff.
- Hedberg O (1962) The genesis of *Puccinellia vacillans*. Bot. Tidsskr. 58 (3), 157–167.
- Heneen WK (1963) Cytology of the intergeneric hybrid *Elymus arenarius* × *Secale cereale*. Hereditas 49, 61–77.
- Hodnett GL et al. (2009) Elimination of a reproductive barrier facilitates intergeneric hybridization of *Sorghum bicolor* and *Saccharum*. Crop Science 50 (4), 1188–1195.
- Janaki-Ammal EK (1942) Intergeneric hybrids of *Saccharum*. IV. *Saccharum-Narenga*. J. Genetics 44 (1) 23–32. <http://www.springerlink.com/content/b38650t024275q08/>
- Janecek J (1984) Application of in vitro cultures in interspecific and intergeneric hybridization of *Lolium* and *Festuca*. PhD thesis. Institute of Experimental Botany, Czechoslovak Acad. Sci. Prague.
- Jauhar PP (1995) Meiosis and fertility of F-1 hybrids between hexaploid bread wheat and decaploid tall wheatgrass (*Thinopyrum ponticum*). Theoretical & Applied Genetics 90 (6), 865–871.

- Jelodar et al. (1999) Intergeneric somatic hybrids of rice *Oryza sativa* L. + *Porteresia coarctata* (Roxb.) Tateoka. Theoretical & Applied Genetics 99, 570–577.
<http://www.springerlink.com/content/va44adqjd7lqd4y0/>
- Jena KK (1994) Production of intergeneric hybrid between *Oryza sativa* L. and *Porteresia coarctata*. Current Science 67, 744–746. <http://grain.jouy.inra.fr/ggpages/rgn/rgn11/v11p78.htm> *Oryzeae* (embryo culture).
- Jenkin TJ (1933) Interspecific and intergeneric hybrids in herbage grasses = Initial crosses. J. Genetics 28 (2), 205–264. e.g. *Glyceria* × *Lolium* and *Dactylis* × *Lolium* without success, which demonstrates that reports of unsuccessful crosses can be revised later
- Jensen KB & Bickford IW (1992) Cytology of intergeneric hybrids between *Psathyrostachys* and *Elymus* with *Agropyron* (Poaceae, Triticeae). Genome 35 (4), 676–680. *Triticeae: Agropyron* × *Elymus*, *Agropyron* × *Psathyrostachys*, *Elymus* × *Psathyrostachys*.
- Jensen KB et al. (1999) Natural hybrids of *Elymus elymoides* × *Leymus salinus* subsp. *salmonis* (Poaceae: Triticeae). Crop Science 39, 976–982.
- Jianwen L & Min D (1996) Morphological and cytogenetical studies on intergeneric hybrid between *Triticum aestivum* and *Eremopyrum orientale*. [Chinese] Acta Genetica Sinica 23 (2), 117–123.
- Johnson BL & Rogler GA (1943) A cyto-taxonomic study of an intergeneric hybrid between *Oryzopsis hymenoides* and *Stipa viridula*. Amer. J. Bot. 30, 49–56.
- Johnson BL (1963) Natural hybrids between *Oryzopsis* and *Stipa*. III. *Oryzopsis hymenoides* × *Stipa pinetorum*. Amer. J. Bot. 50, 228–234.
- Junker R (1993) Der Grundtyp der Weizenartigen (Poaceae, Tribus Triticeae). [German with English summary] pp. 75–93 in Scherer S (ed.) Typen des Lebens. Berlin: Pascal.
- Junker R (2025) The basic type of the wheat grasses (Poaceae, Tribe Triticeae). In Sanders RW (ed.) Basic types of life. Tulsa, Oklahoma: Blyth Institute Press, pp. 103–129.
- Katayama T (1995) Cytogenetical studies on the genus *Oryza*. 14. Intergeneric hybridizations between tetraploid *Oryza* species and diploid *Leersia* species. Japanese J. Genetics 70, 47–55.
<http://www.mendeley.com/research/cytogenetical-studies-genus-oryza-xiv-intergeneric-hybridizations-between-tetraploid-oryza-species-diploid-leersia-species/> *Oryzeae: no true hybrids*
- Kang H et al. (2011) Production and cytogenetics of trigeneric hybrid involving *Triticum*, *Psathyrostachys* and *Secale*. Genetic Resources and Crop Evolution.
- Kang H et al. (2012) Molecular cytogenetic characterization and stripe rust response of a trigeneric hybrid involving *Triticum*, *Psathyrostachys*, and *Thinopyrum*. Genome 55 (5), 383–390.
- Kiang AS et al. (1994) Paternal inheritance of mitochondria and chloroplasts in *Festuca pratensis* × *Lolium perenne* intergeneric hybrids. Theoretical & Applied Genetics 87, 681–688.
- Knobloch IW (1968) A checklist of crosses in the Gramineae. East Lansing: Michigan State University. Some data is questionable. The data on Triticeae seems to be correct.
- Krahulec F & Nesvadbová J (2007) Intergeneric hybrid *Festuca rubra* × *Vulpia myuros* in the Czech Republic. Preslia 79: 63–68
- Laurie DA & Bennett MD (1986) Wheat × maize hybridization. Canad. J. Genetics & Cytology 28 (2), 313–316. *Asymmetric*.
- Leblanc O et al. (1995) Detection of the apomictic mode of reproduction in maize *Tripsacum* hybrids using maize RFLP markers. Theoretical & Applied Genetics 90, 1198–1203.
- Lee DJ et al. (1998) Isozyme markers in *Saccharum* spp. hybrids and *Erianthus arundinaceus* (Retz.) Jeswiet. Austral. J. Agricult. Res. 49, 915–921.
- Löve A (1984) Conspectus of the Triticeae. Feddes Repert. 95, 425–521.
- Li X et al. (2006) Cytogenetic study of a trigeneric (triticale × tritileymus) hybrid. Euphytica 150, 117–122. <http://www.springerlink.com/content/f2268wg2216r1v3j/>
- Lu BR, Salomon B & Bothmer R von (1990) Cytogenetic studies of progeny from the intergeneric crosses *Elymus* × *Hordeum* and *Elymus* × *Secale*. Genome 33 (3), 425–432.
- Marais GF, Marais AS & Badenhorst PC (1998) Hybridization of *Thinopyrum distichum* and *Secale cereale*. Plant Breeding 117 (2), 107–111.

- Matzk F (1981) Successful crosses between *Festuca arundinacea* Schreb. and *Dactylis glomerata* L. Theoretical & Applied Genetics 60, 119–122.
- Matzk F (1996) Hybrids of crosses between oat and Andropogoneae or Paniceae species. Crop Science 36, 17–21. [Asymmetric hybrids of Avena and Pennisetum, Tripsacum and Zea.](#)
- Matzk F, Groeber K & Zacharias M (1980) Results of interspecific and intergeneric crosses in Gramineae in relation to natural reproductive isolating mechanisms. [German] Kulturpflanze 28, 257–284. [Poeae: Dactylis × Festuca.](#)
- Mázik-Tôkei K, Janovszky J, Gyulai G & Heszy LE (1995) Cytogenetic studies of the intergeneric hybrid *Agropyron repens* (L.) × *Bromus inermis* Leyss cv. nanus. Proc. FAO/IAEA Int. Symp. Vienna, pp. 111–112. [See also Gyulai et al. 1992.](#)
- Mázik-Tôkei K et al (1995) Cytogenetic studies of the intergeneric hybrid *Agropyron repens* L. × *Bromus inermis* Leyss cv. nanus and its somaclones. 25. Annual Meeting of ESNA (European Society for New Methods in Agricultural Research. Castelnuovo Fogliani (Piacenza), Book of Abstracts, pp. 122–123.
- McIntyre CL (1988) Variation at isozyme loci in Triticeae. Pl. Syst. Evol. 160, 123–142.
- Mujeeb-Kazi A (1996) Apomixis in trigeneric hybrids of *Triticum aestivum* / *Leymus racemosus* / *Thinopyrum elongatum*. Cytologia 61, 15–18.
- Nair NV (1999) Production and cyto-morphological analysis of intergeneric hybrids of *Sorghum* × *Saccharum*. Euphytica 108 (3), 187–191.
- Nakajima G (1971) Cytogenetical studies on intergeneric hybrids between *Haynaldia villosa* and *Secale fragile* part 6. External characteristics and meiosis in pollen mother cells of SFHVF-3 and F-4 plants. Kromosomo (Tokyo) 83, 2666–2677.
- Nataraja BV & Rao JT (1970) Occurrence of axillary buds in an intergeneric hybrid between *Saccharum officinarum* L. and *Sclerostachya fusca* A. Camus. Current Science 39 (21), 497+.
- Nitsch C, Mornan K & Godard M (1985) Intergeneric crosses between *Zea* and *Pennisetum* reciprocally by in-vitro methods. In Mulcahy DL, Mulcahy GB & Ottaviana E (eds.). Biotechnology and Ecology of Pollen; Int. Conf., Amherst, Mass., USA, July 9–11, 1985. New York: Springer. [Maydeae × Paniceae.](#)
- Oertel C (1997) Erschließung genetischer Ressourcen für die Gräserzüchtung über intergenerische Kreuzungen. Aachen: Shaker (= Berichte aus der Agrarwissenschaft). Dissertation, University of Halle 1997.
- Oertel C & Matzk F (1998) Sterility in spite of regular meiosis in novel allotetraploid hybrids between *Lolium multiflorum* and *Dactylis glomerata*. Current Topics in Plant Cytogenetics Related to Plant Improvement 1998: 215–219.
- Oertel C, Fuchs J & Matzk F (1996) Successful hybridization between *Lolium* and *Dactylis*. Plant Breeding 115, 101–105.
- Orgaard M (1994) Intergeneric hybridization between species of *Leymus*, *Psathyrostachys* and *Hordeum* (Poaceae, Triticeae). Annals of Botany (London) 73 (5), 471–479.
- Otto L-G (2003) Entwicklung neuartiger intergenerischer Hybriden bei Futtergräsern (Pooideae). Diss. Univ. Halle-Wittenberg. <http://sundoc.bibliothek.uni-halle.de/diss-online/03/03H203>
- Park J, Yu Q, Gracia NS, Acuna GM & da Silva JA (2011) Development of new intergeneric cane hybrids, miscanes, as a source of biomass feedstock for biofuel production. Plant & Animal Genomes XIX Conference January 15–19, 2011. San Diego, CA. http://www.intl-pag.org/19/abstracts/W47_PAGXIX_319.html
- Peterson PM et al. (2019) A key to the North American genera of Stipeae (Poaceae, Pooideae) with descriptions and taxonomic names for species of *Eriocoma*, *Neotrinia*, *Oloptum*, and five new genera: *Barkworthia*, × *Eriosella*, *Pseudoeriocoma*, *Ptilagrostiella*, and *Thorneochloa*. Phytokeys 126, 89–125.
- Pickering RA (1987) An evaluation of *Hordeum vulgare* × *Psathyrostachys fragilis* (Boiss.) Nevski crosses for doubled haploid barley production. Plant Breeding 99 (3), 177–180.
- Plourde A, Comeau A, Fedak G & St Pierre CA (1989) Intergeneric hybrids of *Triticum aestivum* × *Leymus multicaulis*. Genome 32 (2), 282–287.

- Prodan I (1936) Plante din Romania. Bul. Grad. Bot. Univ. Cluj 16, 85–101.
- Rao AN (1987) Bamboo flowering and hybridisation. Some new findings & their implications. IDRC Bamboo/Rattan Network. Newsletter 4. [Bambusoideae intertribal](#).
- Read JC & Bashaw EC (1974) Intergeneric hybrid between pearl millet and buffel grass. Crop Science 14 (3), 401–403.
- Riera Lizarazu O, Rines HW & Phillips RL (1996) Cytological and molecular characterization of oat × maize partial hybrids. Theoretical & Applied Genetics 93 (1–2), 123–135. [Asymmetric](#).
- Sakamoto S (1967) Cytogenetic studies in the tribe Triticeae. V: Intergeneric hybrids between the two *Eremopyrum* species and *Agropyron tsukushiense*. Seiken Zihō 19, 19–27.
- Sakamoto S (1972) Intergeneric hybridization between *Eremopyrum orientale* and *Henrardia persica*, an example of polyploidy species formation. Heredity 28, 109–115.
- Sakamoto S (1974) Intergeneric hybridization among three species of *Heteranthelium*, *Eremopyrum* and *Hordeum*, and its significance for the genetic relationships within the tribe Triticeae, New Phytol. 73, 341–350.
- Sando WJ (1935) Intergeneric hybrids of *Triticum* and *Secale* with *Haynaldia villosa*. J. Agricult. Res. 51, 0759–0800.
- Schooler AB (1966) *Elymus caput-medusae* L. crosses with *Aegilops cylindrica* Host. Crop Sci. 6, 79–83.
- Sharma HC (1995) How wide can a wide cross be? Euphytica 82, 43–64.
- Sharma HC & Gill BS (1983) Current status of wide hybridization in wheat. Euphytica 32, 17–31.
- Sobhakumari VP & Nair NV (2007) In vitro induction of colchiploidy in an intergeneric hybrid of *Sorghum* × *Saccharum*. Cytologia 72, 303–308.
- Soreng RJ & Terrell EE (1997) Taxonomic notes on *Schedonorus*, a segregate genus from *Festuca* or *Lolium*, with new nothogenus × *Schedololium* and new combinations. Phytologia 83, 85–88.
- Soreng RJ et al. (2022) A worldwide phylogenetic classification of the Poaceae (Gramineae) III. <https://www.tropicos.org/docs/meso/WORLDWIDE%20CLASSIFICATION%20OF%20POACEAE%20TROPICOS%20version%20APR%2028%202022.htm>
- Spellenberg RW & Mehlenbacher LE (1971) Anatomical and cytological studies of an intergeneric hybrid *Oryzopsis hendersonii* crossed with *Stipa lemmonii* Gramineae. Canad. J. Bot. 49 (9), 1565–1574.
- Sreenivasan TV & Jalaja NC (1982) Production of subclones from the callus culture of *Saccharum*–*Zea* hybrid. Plant Science Letters 24 (3), 255–260.
- Sreenivasan J & Sreenivasan TV (1984a) In vitro propagation of a *Saccharum officinarum* (L.) and *Sclerostachya fusca* (Roxb.) A. Camus hybrid. Theoretical & Applied Genetics 67 (2–3), 171–174. <http://www.springerlink.com/content/m2311j4g83r79057/>
- Sreenivasan TV & Sreenivasan J (1984b) Cytology of *Saccharum* complex from New Guinea, Indonesia and India. Caryologia 37, 351–358.
- Sun GL (1995) Production and cytogenetics of intergeneric hybrids between *Triticum durum*, *Dasypyrum villosum* amphidiploid and *Psathyrostachys huashanica*. Euphytica 81, 7–11.
- Sun GL et al. (1995a) Cytogenetic and genomic relationships of *Thinopyrum elongatum* with two *Psathyrostachys* species and with *Leymus secalinus* (Poaceae). Plant Syst. Evol. 197, 225–231.
- Sun GL et al. (1995b) Morphology and cytology of intergeneric hybrids involving *Leymus multicaulis* (Poaceae). Plant Syst. Evol. 194, 83–91.
- Sun GL et al. (1995c). Production and cytogenetics of intergeneric hybrids between *Triticum durum* – *Dasypyrum villosum* amphiploid and *Psathyrostachys huashanica*. Euphytica 81, 7–11.
- Takahashi K et al. (1994) Allozyme evidence for intersectional and intergeneric hybridization in the genus *Sasa* and its related genera (Poaceae; Bambusoideae). J. Phytogeography and Taxonomy 42, 49–60.
- Talbert LE et al. (1990) *Tripsacum andersonii* is a natural hybrid involving *Zea* and *Tripsacum*: molecular evidence. Amer. J. Bot. 77, 722–726.
- Tang J (1998) Study on the contribution of assimilates to grain yield formation of high-yielding intergeneric hybrid (*Oryza* × *Sorghum*) among canopy leaves. [Chinese with English summary] J. Zhejiang University Nat. Sciences ed. 32, 116–121.

- Tang J, Chen X & Shimizu K (2002) Varietal differences in photosynthetic characters and chlorophyll fluorescence induction kinetics parameters among intergeneric progeny derived from *Oryza* × *Sorghum*, its parents, and hybrid rice. [Chinese] J. Zhejiang Univ. Science 3, 113–117.
- Terrell EE, Hovin AW & Hill HD (1965) Natural hybrids between *Sphenopholis obtusata* and *Trisetum pensylvanicum* (Gramineae). *Bull. Torrey Bot. Club* 92, 169–182.
- Toshinori K et al. (2010) Comparison of 2,4-D and dicamba treatments for embryo development and plant regeneration between *Lolium multiflorum* Lam. and *Dactylis glomerata* L. *Grassland Science* 56 (1), 37–41.
- Triplett JK et al. (2010) Phylogenetic relationships and natural hybridization among the North American woody bamboos (Poaceae: Bambusoideae: *Arundinaria*). *Amer. J. Bot.* 97, 471–492.
- Triplett JK et al. (2014) Independent allopolyploidization events preceded speciation in the temperate and tropical woody bamboos. *New Phytologist* 204 (1), 66–73.
- Meer MHJ van der (2019) 18 new nothogenera and 8 new combinations in the grass family Poaceae. *Cact. Phantast.* 2019 (3) 2, 10–25. <https://doi.org/10.5281/zenodo.2556225> Some of the “nothogenera” are now nothospecies and some other are unconfirmed.
- Venkateswarlu J et al. (1977) Cytological study of *Trilobachne cookeri* (Maydeae). *Proc. Indian Acad. Sciences Section B* 86 (5), 295–302.
- Wang RRC (1986) Diploid perennial intergeneric hybrids in the tribe Triticeae II. Hybrids of *Thinopyrum elongatum* with *Pseudoroegneria spicata* and *Critesion violaceum*. *Biologisches Zentralblatt* 105 (4), 361–368.
- Wang RRC (1987) Diploid perennial intergeneric hybrids in the tribe Triticeae III. Hybrids among *Secale montanum*, *Pseudoroegneria spicata* and *Agropyron mongolicum*. *Genome* 29 (1), 80–84.
- Wang RRC (1988a) Diploid perennial intergeneric hybrids in the tribe Triticeae IV. Hybrid among *Thinopyrum bessarabicum*, *Pseudoroegneria spicata* and *Secale montanum*. *Genome* 30 (3), 356–360.
- Wang RRC (1988b) Coenocytism ameiosis and chromosome diminution in intergeneric hybrids in the perennial Triticeae. *Genome* 30 (5), 766–775.
- Wang RRC et al. C (1985) Intergeneric hybrids of *Agropyron* and *Pseudoroegneria*. *Botanical Gazette* 146 (2), 268–274.
- Wang YM et al. (2005) Extensive de novo genomic variation in rice induced by introgression from wild rice (*Zizania latifolia* Griseb.). *Genetics* 170 (4), 1945–1956. [Asymmetric](#).
- Watson L (1990) The grass family, Poaceae. pp. 1–31 in Chapman GP (ed.) *Reproductive versatility in the grasses*. Cambridge etc.: Cambridge University Press.
- Watson L, Macfarlane TD & Dallwitz MJ (1992 onwards). The grass genera of the world: descriptions, illustrations, identification, and information retrieval; including synonyms, morphology, anatomy, physiology, phytochemistry, cytology, classification, pathogens, world and local distribution, and references. Version: 15th June 2025. delta-intkey.com.
- White WJ (1940) Intergeneric crosses between *Triticum* and *Agropyron*. *Sci. Agric.* 21, 198–232.
- Woelk A & Roeser M (2017) Hybridization and long-distance colonization in oat-like grasses of South and East Asia, including an amended circumscription of *Helictotrichon* and the description of the new genus *Tzveleviochloa* (Poaceae). *Taxon* 66, 20–43.
- Xiang FN et al. (1999) Asymmetric somatic hybridization between wheat (*Triticum aestivum*) and *Bromus inermis*. *Acta Bot. Sinica* 41 (5), 458. [Asymmetric](#).
- Xu WW & Sleper DA (1994) Phylogeny of tall fescue and related species using RFLPS. *Theoretical & Applied Genetics* 88 (6–7), 685–690. [Festuca](#) × [Lolium](#).
- Yen C et al. (1993) Intermeiocyte connections and cytotoxicity in intergeneric hybrid of *Roegneria ciliaris* (Trin.) Nevski with *Psathyrostachys huashanica* Keng. *Cytologia (Tokyo)* 58 (2), 187–193.
- Zenkter M & Nitzsche W (1984) Wide hybridization experiments in cereals. *Theoretical & Applied Genetics* 68 (4), 311–316. [Triticeae](#) × [Poeae](#) etc.
- Zhang G-C & Chen F-S (1980) No. 1 of Chengmaqing, a good bamboo hybrid. *Forest Sci. Technol. Gansu* 16, Suppl. 1, 124–126. [in Chinese]. [Bambusa](#) × [Dendrocalamus](#).
- Zhang HQ & Zhou YH (2007) Meiotic analysis of the interspecific and intergeneric hybrids between

Hystrix patula Moench and *H. duthiei* ssp. *longearistata*, *Pseudoroegneria*, *Elymus*, *Roegneria*, and *Psathyrostachys* species (Poaceae, Triticeae). Bot. J. Linnean Soc. 153 (2), 213–219. *Hystrix* is not listed by Junker (1993).

Polygonaceae (Caryophyllales) 55: 1115. (3 IG (incl. 1 IT))

knottweed, smartweed or buckwheat family =Knöterichgewächse

4 subfamilies:

Afrobrunnichia 1: 2, *Eriogonoideae* 28: 520, *Polygonoideae* 15: 590, *Symmerioideae* 1: 1.

Polygonoideae 15: 595. 3 IG (incl. 1 IT)

7 tribes:

Callygoneae 2, *Fagopyreae* 1: 25, *Persicarieae* 3: 260, *Polygoneae* 6: 135, *Oxygoneae* 1, *Rumiceae* 3: 231.

Fallopia aubertii (= *baldschuanica*) × *Reynoutria* (*Fallopia*) *japonica* **Polygoneae RMF-clade** (→ × *Reyllopia* 1998 J. Holub in Preslia 70 (2): 110; *Fallopia* × *conollyana* J. P. Bailey 2001 Watsonia 23 (4): 539) (nat. hyb. Great Britain) (sterile) Stace 1995, IPNI 2007, Fuchs & Keil 2019, POWO 2026, AP website accepts *Reynoutria* as own genus.

Muehlenbeckia australis × *Reynoutria* (“*Fallopia*”) *japonica* **Polygoneae RMF-clade** (→ × *Fallenbeckia* M. H. J. van der Meer 2019) Schuster et al. 2015 (short notice), POWO 2026

Persicaria (“*Polygonum*”) *hydropiper* × *Rumex obtusifolius* **IT Persicarieae × Rumiceae** (→ × *Polygonorumex*° Weill 1947 in Bull. Soc. Bot. France 93, 321) IK 1950, Knobloch 1972, Willis 1985, a detailed description exists as well as a type specimen! Feng et al. 2024 (× *Persirumex* Z. H. Feng 2024, with description), AP website 2026

References:

Fuchs R & Keil P (2019) Ein Vorkommen von *Fallopia* × *collyana* (Polygonaceae) in Essen (Nordrhein-Westfalen). Florist. Rundbriefe 53, 2–11.

Schuster TM et al. (2015). An updated molecular phylogeny of Polygonoideae (Polygonaceae): Relationships of *Oxygonum*, *Pteroxygonum*, and *Rumex*, and a new circumscription of *Koenigia*. Taxon. 64, 1188–1208. doi: [10.12705/646.5](https://doi.org/10.12705/646.5).

Weill J & Bournérias M (1947) *Polygonorumex Guineti* J. Weill (*Rumex obtusifolius* L. × *Polygonum hydropiper* L.). Bull. Soc. Bot. France 93 (9), 321–326. doi: [10.1080/00378941.1946.10834543](https://doi.org/10.1080/00378941.1946.10834543) cf. <https://www.tandfonline.com/doi/pdf/10.1080/00378941.1946.10834543> <https://plants.jstor.org/stable/10.5555/al.ap.specimen.p02428132>

Potamogetonaceae (Alismatales) 4: 113

Monophyletic.

2 tribes:

Potamogetoneae 2: 100 *Groenlandia*, *Potamogeton* (incl. *Stuckenia*°).

Zannichellieae 3: 13 *Zannichellia*,

IS: POWO (2026): *Potamogeton* 85 IS, *Stuckenia*° (= *Potamogeton*) 3 IS.

References:

Kaplan Z & Fehrer J (2006) Comparison of natural and artificial hybridization in *Potamogeton*. Preslia 78, 303–316.

Proteaceae (Proteales) 80: 1615. (2 IG)

5 subfamilies:

Proteoideae 25: 655, ...

Proteoideae 25: 640. **2 IG**

4 tribes, e.g. Leucadendreae (3 subtribes) 11: 280 *Diastella* 7, *Leucospermum* 48, *Sorocephalus* 11, *Stalla* 20, ...

Diastella thymelaeoides × *Leucospermum oleifolium* Leucadendreae Leucadendrinae Rebelo 2008 only in the web

Sorocephalus scabridus × *Spatalla caudata* Leucadendreae Leucadendrinae Rebelo 2008 only in internet

References:

Rebelo T (2008) A new transgeneric hybrid. <http://protea.worldonline.co.za/trybrid.htm> ..., cf. <https://www.inaturalist.org/taxa/1599410-Diastella-thymelaeoides-meridiana---Leucospermum-oleifolium>, <https://www.inaturalist.org/taxa/734513-Sorocephalus-scabridus---Spatalla-caudata>

Ranunculaceae (Ranunculales) 62: 2525. (1 IT)

buttercup or crowfoot family = Hahnenfußgewächse

Monophyletic.

5 subfamilies.

Ranunculoideae 46: 2025. **1 IT**

Monophyletic. The tribes are well-supported.

AP website 2026: gene trees are largely discordant.

10 tribes:

Adonideae 3: 66, Anemoneae 13, Callianthemeae 1: 14, Delphinieae 2: 803, Helleboreae 1: 21, Ranunculeae 18: 1700, ...

As to basic type studies in subfamily **Ranunculoideae**: The data available on hybrids so far are not sufficient for definitive statements. But obviously the tribes are well supported so it seems possible that they all represent a basic type, each. See also the situation of *Ranunculus* below.

Adonideae 3: 66

Adonis, *Trollius*, *Megaleranthus*.

IS: POWO (2026): *Adonis* 1 *IS*.

Anemoneae 13: 530

Anemonastrum 32, *Anemone* 90, *Clematis* 325, *Hepatica* 9. *Pulsatilla* 40, ...

IS: POWO (2026): *Anemone* 6, *Clematis* 25 *IS*.

Clematis brachiata (subgen. *Campanella*^o) × *Clematopsis*^o *stanleyi* (= *Clematis villosa* subsp. *stanleyi*; subgen. *Pseudoanemone*) **IS** Anemoneae Letty 1962, Knobloch 1972

Callianthemeae 1: 14

Callianthemum 14.

Delphinieae 2: 800

Aconitum 300, *Delphinium* 500.

IS: POWO (2026): *Aconitum* 27 IS, *Delphinium* 6 IS.

Helleboreae 1: 21

Helleborus 21.

IS: POWO (2026): *Helleborus* 0 IS.

Ranunculeae 18: 1700. 1 IT

Caltha 10, *Ficaria* 4, *Myosurus* 5, *Ranunculus* 1600,

Probably all species of the large genus ***Ranunculus*** (1600) belong to the same basic type. They are connected by 69 interspecific hybrids. But it seems possible from the morphology that the basic type can be enlarged to the whole tribe (18: 1700) or could even include the related monogeneric tribe **Callianthemeae**, if the old report of an intertribal hybrid is correct. But both assumptions need confirmation.

IS: POWO (2026): *Ranunculus* 69 IS.

Anemone coronaria × *Ranunculus asiaticus* IT **Anemoneae** × **Ranunculeae** DHooghe et al. 2009, 2012 (EC partial hybrids, not symmetric, mixoploid)

Callianthemum × ***Ranunculus*** IT **Callianthemeae** × **Ranunculeae** (→ × *Callianthemulus* Ciferri & Giacom. 1954 Nomencl. Fl. Ital., Pt. 2, 337, art. hyb.) IK 1974, IPNI 2011, Willis 1985, POWO 2026

Thalictroideae 9: 330

Aquilegia 80, *Isopyrum* 80, *Thalictrum* 196, ...

IS: POWO (2026): *Aquilegia* 6.

References:

DHooghe E et al. (2009) Production and characterization of intergeneric hybrids between *Anemone coronaria* and *Ranunculus asiaticus*. Acta Horticulturae 855, 101–105. [XXIII International Eucarpia Symposium, Section Ornamentals, Colourful Breeding and Genetics - Part II.](#)

DHooghe E et al. (2012) Intergeneric hybrids between *Anemone coronaria* L. and *Ranunculus asiaticus* L. Acta Horticulturae 937, 171–176. 28th International Horticultural Congress on Science and Horticulture for People (IHC 2010). [very similar to the article of 2009, see also:](#)

[http://www.globalsciencebooks.info/Online/GSBOnline/images/2012/FOB_6\(SI2\)/FOB_6\(SI2\)104-107o.pdf](http://www.globalsciencebooks.info/Online/GSBOnline/images/2012/FOB_6(SI2)/FOB_6(SI2)104-107o.pdf) and 2021

https://doi.org/10.3390/horticulturae7120529?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle

Letty C (1962) Wild flowers of Transvaal. Trustees of the wild flowers of Transvaal bookfund (p. 140).

Rhamnaceae (Rosales) 63: 1055

3 subfamilies:

Ampeloziphoideae 4: 57, Rhamnoideae 15: 306, Ziziphoideae.44: 700.

Rhamnoideae 15: 306

7 tribes, e.g. Rhamneae 15: 306, ...

IS: POWO 2026: *Rhamnus* 10 IS.

Atadinus° (*Oreohertzogia*°, “*Rhamnus*”) × *Rhamnus* IS **Rhamneae** (→ × *Rhamzogia*° W. Vent 1962 in

Fedde Rept. 65, 108; = × *Rhatadinus* Su Liu & Bing Liu) IK 1970, Feng et al. 2024 (2 nothospecies: *A. alpinus* × *R. alaternus* → × *Rhatadinus hybrida*; *A. alpinus* × *R. catharticus* → × *Rhatadinus mercieri*).

Ziziphoideae 44: 700

5 tribes, e.g. Colletieae 7: 22.

Discaria chacaye × *Ochetophila trinervis* Colletieae Medan et al. 2012

References:

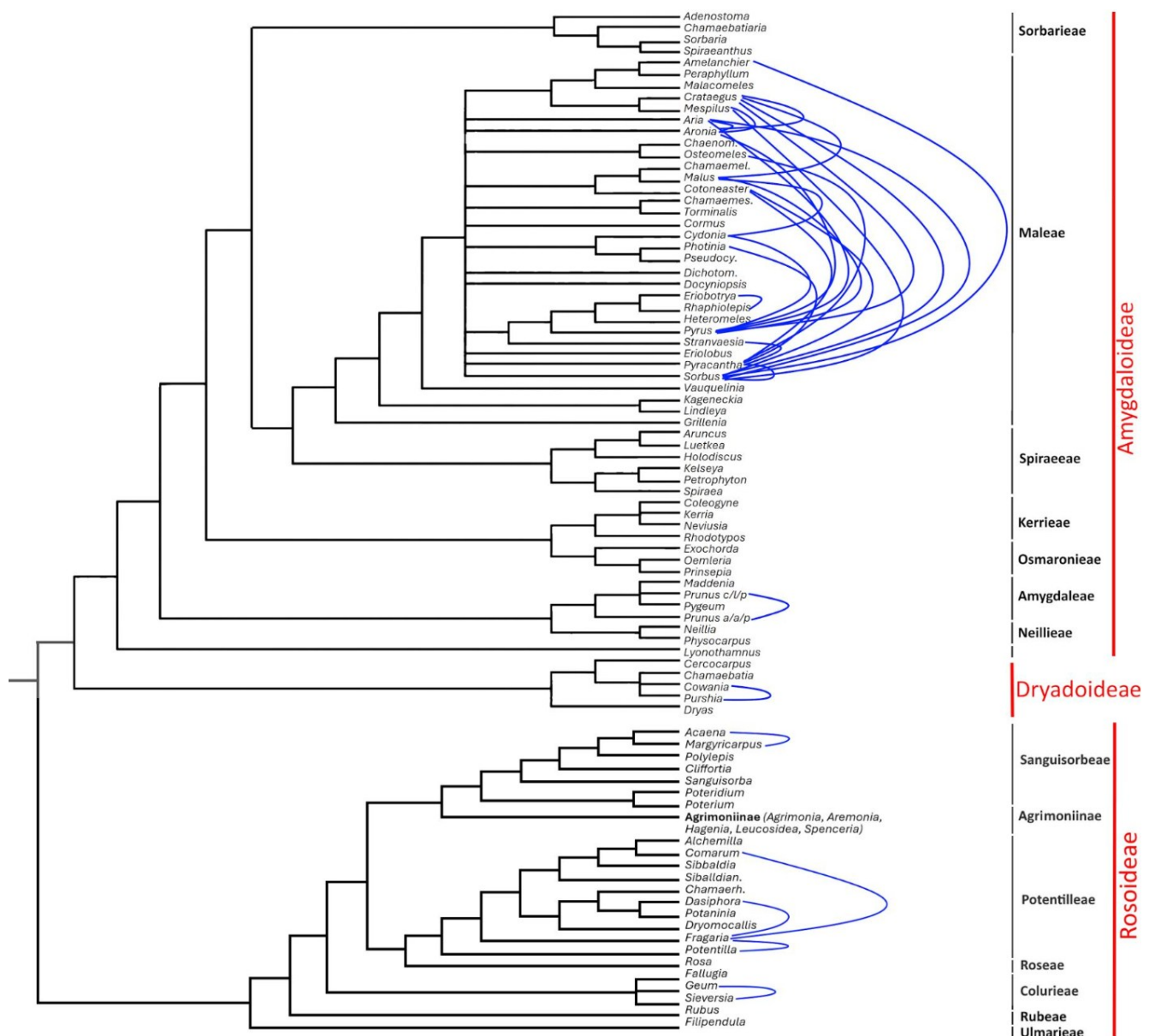
Medan D et al. (2012) Interspecific and intergeneric hybridization in South American Rhamnaceae-Colletieae. *Plant Syst Evol* 298, 1425–1435. <https://doi.org/10.1007/s00606-012-0646-0>

Rosaceae (Rosales) 110: 4900 (incl. apomictic species). (33 IG + 1 IST)

rose family = Rosengewächse

3 subfamilies:

Amygdaloideae 57: 1540, Dryadoideae 4: 19, Rosoideae 37: 3400



Rosaceae: intergeneric hybridization in the phylogeny according to Potter et al. (2007. <https://doi.org/10.1007/s00606-007-0539-9>).

Amygdaloideae 57: 1540

9 tribes:

Amygdaleae 1: 200, Gillenieae (or part of Maleae) 1: 2, Kerrieae 4: 4, Lyonoathamneae 1: 1, Maleae 33: 1.000, Neillieae 2–3, Osmaronieae 3–4, Spiraceae 6–8, Sorbarieae 4: 8.

Amygdaleae (= Prunoideae) 1: 200

stone fruited plants = Steinobstgewächse

Since Potter et al. (2007) most authors include all former genera in one genus *Prunus*.

Prunus (incl. *Aflatunia*[°], *Amygdalus*[°], *Armeniaca*[°], *Laurocerasus*[°], *Louiseania*[°], *Padus*[°], *Persica*[°], *Pygeum*[°], etc.; *Oemleria*[°], *Maddenia*[°], *Prinsepia*[°]).

Basic type Rosaceae Amygdaloideae tribe Amygdaleae (*Prunus* s.l.) (1: 200). Some 46 interspecific hybrids are reported within the genus *Prunus* s.l.; Jens Göppfahrt (1995) studied 19 characters of the former subfamily Prunoideae and showed the uniformity of this clade. – The close relatedness has been confirmed by Chin et al. (2014).

IS: POWO (2026): *Prunus* 46 IS!

Aflatunia[°] (= *Louiseania*[°]) × *Prunus* s.str. **IS** Putov 1982 (2 art. hyb.: *A.*[°] *ulmifolia* = *P. triloba* × *P. pumila* → *P.* × *arnoldiana*; *A.*[°] *ulmifolia* = *P. triloba* × *P. salicina*)

Amygdalus[°] × *Persica*[°] **IS** (→ × *Amygdalopersica* Daniel 1915 Rev. Gén. Bot. 27: 33) (*A.*[°] *dulcis* = *P. dulcis* × *P.*[°] *vulgaris* = *P. persica* → × *Amygdalopersica hybrida* = *P.* × *amygdalopersica*), IK 1952, Knobloch 1972, Willis 1985, Hegi 1995, Mezhenksyj 2013 (3 further nothospecies) – (These sexual hybrids should not be confused with the asexual periclinal chimera (graft hybrid) + *Amygdalopersica* Delpino 1915 with the same combination, which was already mentioned by Plinius.)

Armeniaca[°] × *Microcerasus*[°] **IS** (→ × *Armeniasus*) Mezhenksyj 2013

Armeniaca[°] × *Microcerasus*[°] × *Prunus* s.str. **IS** (→ × *Prunopersirasus*) Mezhenksyj 2013

Armeniaca[°] × *Prunus* s.str. **IS** (→ × *Armenoprunus* Janchen 1958 in Cat. Fl. Austr., 1. Pteridophyt. & Anthophyt., Heft 2, 351; = × *Armeniaco-prunus* Cinovskis) (nat. hyb.: *A.*[°] *vulgaris* = *P. armeniaca* × *P. cerasifera* → *P.* × *dasycarpa*) IK 1966, Nikolaeva & Rotaru 1979, Czerepanov 1995 (cult.), Hegi 1995, http://forum.garten-pur.de/Obst-Forum-25/Wer-kennt-quot-Aprimira-qu-20675_msg1492350A.htm (*A.*[°] *vulgaris* × *P. domestica*), Mezhenksyj 2013, IPNI 2024

Cerasus[°] × *Louiseania*[°] (= *Aflatunia*[°]) **IS** (→ × *Cerasolouiseania* Z. N. Lomakin & Yushev 1978 Byull. Vses. Ord. Lenina Inst. Rast. N. I. Vavilova 81: 23, not in accordance with Art. H 7) IK, Czerepanov 1995 (nat. hyb. in Middle Asia: *C. verrucosa* × *Louiseania* (= *Aflatunia*) *ulmifolia* = *P. triloba*), IPNI 2024

Cerasus[°] × *Padus*[°] **IS** (→ × *Ceropadus* Buia 1956 in Savul. Fl. Reipubl. Popul. Roman. 4, 880) Yenikejev 1938 (fully fertile: [*C. fruticosa* × *C. pennsylvanica*] × *P. maackii*), IK 1966, Knobloch 1972, Willis 1985, IPNI 2013 (2 nothospecies), IPNI 2024

Cerasus[°] × *Prunus* s.str. **IS** Putov & Sankina 1985

Louiseania[°] × *Microcerasus*[°] **IS** (→ × *Lousearasus*) Mezhenksyj 2013

Louiseania[°] × *Prunus* s.str. **IS** (→ × *Prunoseana*) Mezhenksyj 2013

Microcerasus[°] × *Persica*[°] × *Prunus* s.str. **IS** (→ × *Prunopersirasus*) trigenetic/trisubgeneric Mezhenksyj 2013

Microcerasus[°] × *Prunus* s.str. **IS** (→ × *Prunorarasus*) Mezhenksyj 2013

Persica[°] × *Prunus* s.str. **IS** (→ × *Prunopersica*) Mezhenksyj 2013

Gillenieae 1: 2

Formerly part of subfamily Spiraeoideae.

Subtribe Gilleniinae of tribe Maleae according to Sun et al. 2024.

Gillenia 2.

Maleae 33: 957

3 subtribes:

Lindleyinae (formerly part of subfamily Spiraeoideae) 2: 4 (*Kageneckia* 3, *Lindleya* 1).

Vauquelininae (formerly part of subfamily Spiraeoideae) 1: 3 (*Vauquelinia* 3).

Malinae (before 2007 own subfamily Maloideae) 3: 950: see below

Maleae subtribe Malinae (= “Maloideae”) 30: 950. **28 IG**

pome fruited plants = Kernobstgewächse

For a revised subdivision see Sun et al. (2024). *Sorbus* in its classical circumscription is polyphyletic and has meanwhile been split into *Aria*, *Chamaemespilus*, *Cormus*, *Micromeles*, *Sorbus* and *Torminalis*.

Aria 120 (incl. *Micromeles*°), *Cotoneaster* 240, *Crataegus* 230 (incl. *Mespilus*°), *Dichotomanthes*, *Hesperomeles*, *Heteromeles*, *Malus* 36 (incl. *Docynia*°, *Docyniopsis*°), *Macromeles*, *Osteomeles*, *Photinia* (incl. *Aronia*°, *Stranvaesia*°), *Pleiosorbus*, *Pseudocydonia*, *Pyracantha*, *Pyrus* 74, *Raphiolepis* 47 (incl. *Eriobotrya*°), *Sorbus* 160 (excl. *Aria*, *Chamaemespilus*, *Cormus*, *Micromeles*, *Torminalis*), ...

Basic type Rosaceae Amygdaloideae Maleae subtribe Malinae (30: 950) Kutzelnigg 1993, 2003, 2025 (as Rosaceae subfamily Maloideae). Well-defined basic type with the unique pome fruit. Most genera are connected by some 28 intergeneric hybrids, see the figure to Rosaceae above and the figure below. This large number is mainly the result of the economic importance of the genera as crop plants. – Since 1993 (see the figure below) the internal systematics has changed, but this is not relevant for the basic type question. – Interestingly, for some time the genera *Gillenia*, *Kageneckia*, *Lindleya*, and *Vauquelinia*, in which the follicles are free, i.e. not surrounded by an additional tissue (like in the pome fruit) have been transferred from Spiraeoideae to Maleae (or the closely related Gilleniaceae). Possibly, these 4 genera can be included in the basic type, because the absence of tissue surrounding the follicles as main difference seems negligible, see Kutzelnigg 2003, 2025. An actual paper of Sun et al. (2024) favors this view, pointing out that these 4 genera must be placed near to Malinae.

Amelanchier × *Aria* × *Pyrus* (→ × *Ariamelurus* J. M. H. Shaw 2015 in Phytoneuron 53, 2) trigenetic hybrid

Amelanchier × *Aria* × *Sorbus* (→ × *Arisorbanchier* J. M. H. Shaw 2015 in Phytoneuron 53, 2) trigenetic hybrid

Amelanchier × *Sorbus* s.str. (→ × *Amelasorbus* Rehder 1925 in J. Arnold Arb. 6, 154; nat. hyb. in North America) IK 1929, Weber 1964, Phipps et al. 1990, Robertson et al. 1991, Zander 2008 (*A. alnifolia* × *S. scopulina*)

Aria × *Aronia*° (= *Photinia* p.p.) (→ × *Sorbaronia* C. K. Schneider 1906 Repert. Spec. Nov. Regni Veg. 3: 134) (2 nothospecies: *Aria*° *nivea* × *Aronia* *arbutifolia*, *Aria*° *nivea* × *Aronia* *melanocarpa*) IK, Zander 2008, https://www.agroforestry.co.uk/wp-content/uploads/agnews-sample/AGN_sample.pdf 2017 (with photo)

Aria × *Chamaemespilus* (“*Sorbus*”) (→ × *Majovskya* Sennikov & Kurtto 2017) Hedlund 1901, Kárpáti 1960, Düll 1961, Warburg & Kárpáti 1968, Robertson et al. 1991, Kutzelnigg 1994, Meyer et al. 2005

Aria × *Chamaemespilus* × *Sorbus* (→ *Normeyera* Sennikov & Kurtto 2017)

Aria *edulis* (“*nivea*”) × *Pyrus* *communis* (→ × *Sorbopyrus* C. K. Schneider 1906 Ill. Handb. Laubholz. 1: 666 et in Fedde Repert. Nov. Spec. 3: 133; = × *Pyraria* A. Cheval 1925 in Rev. Bot. Appliq. 5: 729; = „*Bollwilleria*” Zabel) (This hybrid is cultivated since 1599 and was named *Pyrus pollwyleriana* by Bauhin 1619) Haussknecht 1902, IK 1929, Knobloch 1972, Phipps et al. 1990,

Kutzelnigg 1994, Postman 1996

Aria × *Sorbus* s.str. (→ *Hedlundia* Sennikov & Kurtto 2017; × *Arsorbus*° Su Liu & Z. H. Feng 2024; = “*Sorbus hybrida* agg. + *mougeotii* agg.”; = × *Ariosorbus*° Koidz.) (several nat. hyb. in Europe, first named by Linné 1755 as „*Crataegus fennica Kalmii*” and 1762 as *Sorbus hybrida*) Hedlund 1901, Düll 1959, 1961, Stace 1975, 1995, Robertson et al. 1991, Feng et al. 2024

Aria × *Sorbus* s.str. × *Aronia*° (*Photinia*) *arbutifolia* https://www.agroforestry.co.uk/wp-content/uploads/agnews-sample/AGN_sample.pdf 2017 (with photo)

Aria × *Sorbus* s.str. × *Torminalis* (→ *Hedlundia intermedia* (Ehrh.) Mosyakin, Fedor. & McNeill; × *Tormariosorbus* (Ehrh.) Mezheniskyj 2012; = *Borkhausenia* Sennikov & Kurtto 2017; “*Sorbus intermedia*”; nat. hyb. Northern Europe) Düll 1959, Challice & Kovanda 1978, Kovanda 1978, Nelson-Jones et al. 2002

Aria × *Torminalis clusii* (“*Sorbus torminalis*”) (→ × *Tormaria* (Májovský & Bernátová) Mezheniskyj; *Karpatisorbus* Sennikov & Kurtto 2017; = “*Sorbus latifolia* agg.”) (ca. 50 nothospecies in Europe, mainly Central Europe), Hedlund 1901, Düll 1959, 1961, Kárpáti 1960, Warburg & Kárpáti 1968, Proctor et al. 1989, Robertson et al. 1991, Meyer et al. 2005

Aronia° (*Photinia*) × *Crataegus* × *Sorbus* s.str. (→ × *Crataronibus* J. M. H. Shaw 2015 in *Phytoneuron* 53, 2) trigenetic hybrid

Aronia° (*Photinia*) × *Mespilus*° (*Crataegus*) × *Sorbus* s.str. (→ × *Mesaronibus* J. M. H. Shaw 2015 in *Phytoneuron* 53, 2) trigenetic hybrid

Chaenomeles × *Malus* Likhonos et al. 1983 (apomict according to Gorshkow cited in Robertson et al. 1991), Gonai et al. 2006 (successful after irradiation of immature shoots)

Chaenomeles × *Pyrus* (→ × *Pyromeles* Mezheniskyj) IPNI 2015

Cotoneaster × *Pyracantha* (→ × *Cotocantha* J. M. H. Shaw 2015 in *Phytoneuron* 53, 2) Egolf & Drechsler 1967, Robertson et al. 1991

Cotoneaster melanocarpus × *Sorbus sibirica* (→ × *Sorbocotoneaster* Pojarkova 1953 in *Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS* 40, 93; nat. hyb. in Eastern Siberia) Pojarkova 1953 (1954), IK 1959, Knobloch 1972, Likhonos et al. 1983, Phipps et al. 1990, Robertson et al. 1991, Czerepanov 1995, Volotovskiy & Kuznetsova 1998

Crataegus × *Cydonia* → according to Robertson et al. 1991 this hybrid is not fully documented

Crataegus × *Malus* Likhonos et al. 1983

Crataegus × *Mespilus*° (*Crataegus* p.p.) IS (→ × *Crataemespilus* 1899 E. G. Camus *J. Bot. (Morot)* 13: 326, nom. illeg.; 3 nothospecies: *C. laevigata* × *M. germanica* → × *C. grandiflora*; *C. monogyna* × *M. germanica* → × *C. gillottii*; *C. brachyacantha* × *M. germanica* → × *C. canescens*) (these sexual hybrids are not to be confused with the graft hybrids = graft chimaeras + *Crataegomespilus* Simon-Louis ex Bellair) IK, Weber 1964, Byatt et al. 1977, Likhonos et al. 1983, Phipps et al. 1990, Robertson et al. 1991

Crataegus × *Pyrus* (obviously confused with the graft hybrid + *Pyrocrataegus* Daniel) Weber 1964, Likhonos et al. 1983

Crataegus × *Sorbus* s.str. (→ × *Crataegosorbus* Makino ex Koidzumi, ined.; = × *Sorbocrataegus* ined.) Likhonos et al. 1983, Phipps et al. 1990, Robertson et al. 1991

Cydonia × *Malus* (→ × *Cydolus* Rudenko 1983 in *Sadovodstvo* 10: 31; = „× *Cydomalus*”) Weber 1964, Shcherbenev 1975, Likhonos et al. 1983, IK 1984, Grushin et al. 1986, for a photo see <http://www.biolib.cz/en/taxonimage/id101634/>, Mezheniskyj 2009, sometimes offered for sale

Cydonia oblonga × *Micromeles*° (*Aria*) Likhonos et al. 1983

Cydonia × *Pseudocydonia* (→ × *Cydocydonia* J. M. H. Shaw 2015 in *Phytoneuron* 53, 2)

Cydonia × *Pyrus* (→ × *Pyronia* Veitch ex Trabut 1916 in *J. Heredity* 7: 416) (2 nothospecies) (these sexual hybrids are not to be confused with the graft hybrids + *Pyrocydonia* H. K. A. Winkler ex L. L. Daniel, known since 1902) Trabut 1916 (*C. oblonga* × *P. communis*), IK 1929, Weber 1964, Likhonos et al. 1983, Robertson et al. 1991, http://www.ars-grin.gov/cor/presentations/Intergeneric%20Pomes%20HTML/IntergenericPomes_frame.html (*C. oblonga* × *P. pyrifolia*)

Eriobotrya° (*Rhaphiolepis*) × *Rhaphiolepis* IS (→ × *Rhaphiobotrya* Coombes 2008 in *Plantsman* n. s.

7 (3), 164; = *Eriobotrya* ‘Coppertone’) Coombes et al. 2007 (*E. japonica* × *R. indica*), IPNI 2010, <http://www.n-nourin.jp/kashi/kenkyuhoukoku/10-3.pdf> [Japanese with Engl. summary]

Malus × *Micromeles*^o (= *Aria* p.p.) Likhonos et al. 1983

Malus domestica, *prunifolia* × *Pyrus communis*, *serotina* (→ × *Pyrus* Mezheniskyj 2011 Introd. Rosl. 2011 (3): 55–57) Shimura et al. 1980, Likhonos et al. 1983, Shin et al. 1989, Inoue et al. 2003, IPNI 2011, Fischer et al. 2014 (*M. domestica* × *P. communis*)

Malus × *Torminalis clusii* (“*Sorbus torminalis*”) (→ × *Malosorbus* Browicz 1970 in Fragm. Florist. Geobot. Krakow 16, 70; = *Malus florentina*; = × *Tormimalus* J. Holub 1998 in Preslia 70 (2): 115) Wenzig 1874, Browicz 1970, IK 1974, Robertson et al. 1991, IPNI 2008 → the hybridogeneous origin of *Malus florentina* is controversially debated and doubted by Huckins 1972 and Qian et al. 2008

Mespilus^o (*Crataegus*) × *Sorbus* (→ × *Mespilosorbus* Mezheniskyj ex J. M. H. Shaw 2015 in Phytoneuron 53,2) Likhonos et al. 1983, Germplasm Resources Information Network 2011 (<http://www.ars-grin.gov/cgi-bin/npgs/html/genus.pl?11302>)

Micromeles^o (= *Aria* p.p.) × *Pyrus* Likhonos et al. 1983, see *Aria* × *Pyrus*

Micromeles^o (= *Aria* p.p.) × *Sorbus* Likhonos et al. 1983, see *Aria* × *Sorbus*

Osteomeles subrotunda × *Pyracantha crenatoserrata* (→ × *Pyracomeles* 1937 Rehder ex Rev. Hort. 25, 489, in obs.; Guillaumin 1937 in Bull. Soc. Nat. Hort. France, Ser. 6, iv, 191, 198; cult.) IK 1947, Weber 1964, Knobloch 1972, Likhonos et al. 1983, Phipps et al. 1990, Robertson et al. 1991, Zander 2008

Photinia (= *Aronia*^o) × *Crataegus* Likhonos et al. 1983

Photinia × *Pyracantha* (→ × *Photacantha* J. M. H. Shaw 2015 in Phytoneuron 53, 2)

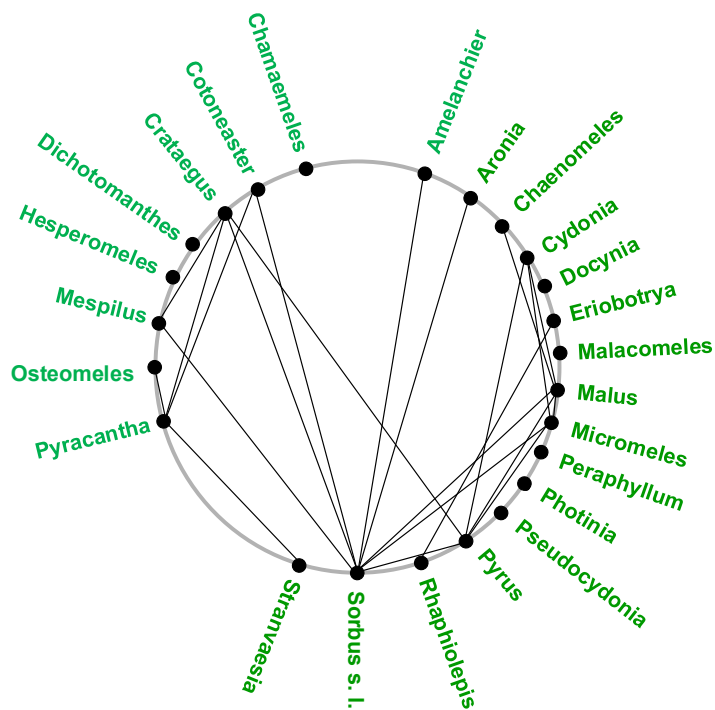
Photinia (*Aronia*^o) × *Pyrus* Likhonos et al. 1983

Photinia (*Aronia*^o) × *Sorbus* s.str. (→ × *Sorbaronia* C. K. Schneider 1906 Repert. Spec. Nov. Regni Veg. 3: 134) (3 nothospecies nat. hyb. in North America) Hedlund 1901, Weber 1964, Knobloch 1972, Phipps et al. 1990, Robertson et al. 1991, Zander 2008, Connolly 2009, picture: http://www.ars-grin.gov/cor/presentations/Intergeneric%20Pomes%20HTML/IntergenericPomes_slide0054_image045.jpg

Pyracantha × *Sorbus* (→ × *Sorbacantha* hort. ex J. M. H. Shaw 2015 in Phytoneuron 53, 2)

Pyracantha × *Stranvaesia* (→ × *Pyraesia* Lancaster, ined.; cult.) IT Phipps et al. 1990, Robertson et al. 1991

Pyrus × *Sorbus* s.str. Robertson et al. 1991



Rosaceae, classical subfamily Maloideae: intergeneric hybrid connections in the old circumscription of genera of 1993. Left side: former tribe “Crataegeae”, right side: former tribe “Maleae”. *Sorbus* in this polygon includes *Aria*, *Chamaemespilus*, *Cormus* and *Torminalis*. From Kutzelnigg 2025.

Dryadoideae 4: 19

Cercocarpus, *Chamaebatia*, *Dryas*, [*Fallugia* → now *Colurieae*], *Purshia* (incl. *Cowania*[°]).

Cowania (= *Purshia*) *stansburyana* × *Fallugia* *paradoxa* (→ × *Fallania* J. M. H. Shaw 2015 in *Phytoneuron* 53, 2; art. hyb.) **Dryadeae × Geeae ISF** → Blauer et al. 1975 (see Baker et al. 1984).

This putative hybrid was found to be **undocumented** by Baker et al. 1984 who argue that it is an abnormal form of *Cowania stansburyana*. In addition, *Fallugia paradoxa* has been transferred to *Colurieae* meanwhile. So, it is unintelligible that Shaw in 2015 publishes a new nothogenus name × *Fallania* for *Cowania* × *Fallugia* (hort. art. hyb.). Obviously, this refers to a graft hybrid and not a sexual hybrid published by Kyle et al. 1986!

***Cowania*[°] (= *Purshia*) *stansburyana* × *Purshia tridentata* IS (nat. hyb.) Stutz & Thomas 1963, Knobloch 1972**

Rosoideae 36: 3400 (incl. apomictic species)

6 tribes (strongly supported by Chen et al. 2020):

Colurieae 3: 42, Potentilleae 19: 1740, Roseae 1: 180, Rubeae 1: 1730, Sanguisorbeae/Agrimoniaeae (formerly 2 separate tribes), 12: 274, Ulmarieae 1: 10 (*Filipendula*).

Colurieae = Geeae 3–5: 58. **2 IG**

avenses and allies = Nelkenwurz-Verwandte

Coluria 10, *Fallugia* 1 *paradoxa*, *Geum* 40 (incl. *Acomastylis*[°], *Erythrocoma*[°], *Neosieversia*[°], *Oncostylus*[°], *Orthurus*[°], *Parageum*[°], *Taihangia*[°]), *Sieversia* 2, *Waldsteinia* 6.

IS: POWO (2025): *Geum* 16 IS.

Basic type Rosaceae Rosoideae tribe Colurieae (3: 42): Junker 1993, 2025 (as „Geeae”). After publication of the basic type by Junker in 1993 this tribe has been enlarged by the genus *Coluria* and renamed from Geeae to Colurieae. – According to Chen et al. (2020) this tribe is strongly supported by molecular data.

~~*Cowania* (= *Purshia*) *stansburyana*~~ × ~~*Fallugia* *paradoxa*~~ **ISF Dryadoideae × Colurieae** (→ × *Fallania* J. M. H. Shaw) IPNI 2024. Erroneus, grafts only, see Dryadoideae

Coluria × *Waldsteinia* (→ *Geum heterocarpum*) hybridogeneous origin **HY** Smedmark et al. 2003

Erythrocoma^o (= *Geum* p.p.) × *Geum* s.str. **IS** Junker 1993 (Gajewski 1957, 1959, Bolle 1933)

Erythrocoma^o (= *Geum* p.p.) × *Oreogeum*^o (= *Geum* p.p.) **IS** Junker 1993 (Gajewski 1957, 1959, Bolle 1933)

Geum × *Oreogeum*^o (= *Geum* p.p.) **IS** Junker 1993 (Gajewski 1957, 1959, Bolle 1933) – now interspecific

Geum × *Parageum*^o (= *Geum* p.p.) **IS** (→ × *Gerageum* Soják 1983 in Cas. Nar. Muz. (Prague) 152: 21) IK 1991, IPNI 2024

Geum × *Sieversia* (= *Geum* p.p.) (→ × *Geversia* 1950 Dostál, Kvetena CSR (Fl. Czechoslovak.) ed. 2, 660) IK 1959, Knobloch 1972, Junker 1993 (17 nothospecies!), IPNI 2024

Potentilleae 18: 1740. 3 IG (incl. 1 IST)

cinquefoils and allies = Fingerkraut-Verwandte

2–3 subtribes:

Alchemillinae *Alchemilla* (incl. *Aphanes*^o, *Lachemilla*^o) 1000.

Fragariinae *Chamaerhodos*, *Comarum*, *Dasiphora* (incl. *Potaninia*^o), *Drymocallis*, *Fragaria* 25, *Sibbaldia* (incl. *Sibbaldianthe*^o, *Sibbaldiopsis*^o).

Potentillinae *Argentina*, *Potentilla* (incl. *Duchesnea*^o) 300–500 (many of them apomicts).

Basic type Rosaceae Rosoideae tribe Potentilleae (18: 1740). It is a uniform taxon, connected by several hybrids including the most distant genera, see the figure below.

Comarum palustre (“*Potentilla palustris*”) × *Fragaria* × *ananassa* **Fragariinae** (→ × *Comagaria* Büscher & G. H. Loos 2010 Jahrb. Bochum. Bot. Ver. 2 (1): 6) Ellis 1962 (*C. p.* × *F.* × *ananassa*), Knobloch 1972 (*C. p.* × *F.* „*grandiflora*” = *F.* × *ananassa* subsp. *cuneifolia*), Mabberley 2002, Loos 2010 (*C. p.* × *F.* × *ananassa* → × *Comagaria rosea* (Mabb.) Büscher & G. Loos = *Potentilla* × *rosea* Mabb. 2002), IPNI 2011, Ding et al. 2019

http://en.wikipedia.org/wiki/Fragaria_%C3%97_Comarum_hybrids,

<http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=E998>

Dasiphora^o (= *Potentilla*) *fruticosa* × *Fragaria* **IST Potentillinae × Fragariinae** (→ × *Fragiphora* J. M. H. Shaw 2015 in Phytoneuron 53, 2) Harland 1957 (*D. f.* × *F.* × *ananassa*, see Asker 1971), Ellis 1962 (*D. f.* × *F.* × *ananassa*, *D. f.* × *F. vesca*), Asker 1970, 1971 (*D. f.* × *P. moschata*), Knobloch 1972, Macfarlane Smith & Jones 1985a, b (*D. f.* × *F. moschata*), Silva 1990 **EC**, Sayegh & Hennerty 1993 **EC**, Jelenkovic et al. 1984 (*D. f.* × *F.* × *ananassa*), Silva 1990 **EC** (*D. f.* × *F. vesca*), Silva & Jones 1996 **EC**

Drymocallis × *Fragaria* **Fragariinae** (→ × *Drymogaria* J. M. H. Shaw 2015 in Phytoneuron 53, 2) (species not listed)

Duchesnea indica^o (*Potentilla indica*) × *Fragaria* × *ananassa* **IST Potentillinae × Fragariinae** Marta et al. 2004

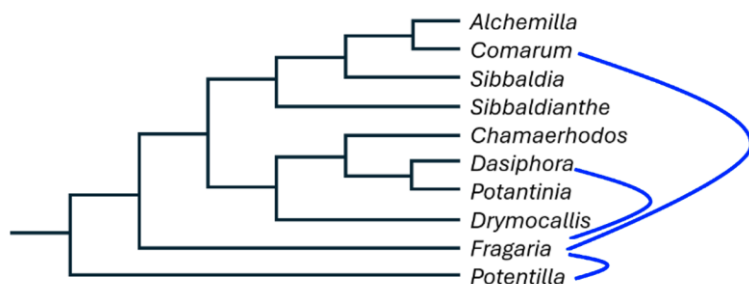
Duchesnea indica^o (*Potentilla indica*) × *Potentilla reptans* **IS Potentillinae** Marta et al. 2004

Fragaria × *Potentilla* **IST Fragariinae × Potentillinae** (→ × *Potenaria* J. M. H. Shaw 2015 in Phytoneuron 53, 2; × *Fragotentilla* ined.) Mangelsdorf & East 1927 (*F. vesca* × *P. nepalensis*), Ellis 1962 (his „*Potentilla*” species are *Dasiphora fruticosa* and *Comarum palustre*), Senanayake & Bringham 1967 (*F. chiloensis* × *P. glandulosa*), Knobloch 1972, Niemirowicz-Szczytt 1985 (matroclinous, no hybrids)

~~*Fragaria* × *ananassa* × *Malus pumila* × *Potentilla* (= *Dasiphora*^o) *fruticosa*~~ **ISF** **Rosoideae** × **Amygdaloideae** (→ × *Fragentalus* Grower & Search) → **this report is a joke!** Grower & Search 1993 („*Fragentalus dalhanceckianus* is a quadridecaploid (14 x) hybrid which might be constituted using various biotechnological methods from the cultivated strawberry (*Fragaria* × *ananassa* L. cv. ‘Sparkle’), the shrubby cinquefoil (*Potentilla fruticosa* L.) and the apple (*Malus pumila* Mill. cv. ‘Mackintosh’). – The plant might be a shrub which reaches 2 m in height in north-central North America and bears large, strawberry-like fruits on fruiting spurs.“)

http://www.actahort.org/members/showpdf?booknrarnr=348_17

Fragaria × *Rubus* **IT** **Potentilleae** × **Rubeae** intertribal → **erroneous**. Most records turned out to be *Rubus illecebrosus* which is no hybrid. What some people call „strasberry” is no hybrid, but a cultivar of *Fragaria* × *ananassa*.



Rosaceae tribe Potentilleae: hybrid connections in the phylogeny of Potter et al. (2007. <https://doi.org/10.1007/s00606-007-0539-9>). The most actual phylogeny of the tribe of Li et al. (2024) based on plastid genes <https://doi.org/10.1016/j.ympev.2023.10796> differs to a certain degree, but this is not relevant for the basic tribe question.

Roseae 1: 180

roses = Rosen

Rosa 180.

Probably **basic type Rosaceae Rosoideae tribe Roseae** (*Rosa*) (1: 180). The monogeneric tribe is well-defined by its unique flower and “fruit”. The species of *Rosa* are connected by the large number of 113 published interspecific hybrids.

IS: POWO (2026): *Rosa* 113 **IS**.

Hulthemia^o (= *Rosa* p.p.) × *Rosa* **IS** (→ × *Hulthemosa* Juzepczuk 1941 in Fl. URSS, ed. Komarov, 10, 507, 638; nat. hyb. in Middle Asia) IK 1950, Knobloch 1972, Czerepanov 1995, POWO 2025 (4 nothospecies of *Rosa*), AP website 2026

Rosa × *Prunus* **ISF** protoplast fusion did not succeed Squirrel et al. 2005

Rosa × *Rubus* **ISF** protoplast fusion did not succeed Squirrel et al. 2005

Rubeae 1: 1730

brambles = Brombeeren

Rubus 1730 (ca. 300 sexual species + many apomicts).

Probably **basic type Rosaceae Rosoideae tribe Rubeae** (*Rubus*) (1: 300 + many apomicts). The monogeneric tribe is well-defined by its unique “fruit” (aggregate of drupelets) and its special type of “shrubs”. According to Chen et al. (2020) this tribe is also molecularly strictly supported. The species of *Rubus* are connected by some 69 interspecific hybrids.

IS: POWO (2026): *Rubus* 69 **IS**.

Sanguisorbeae/Agrimoniaeae 12: 274. 1 IG

Formerly 2 separate tribes, now 2 subtribes:

Agrimoniinae 5: 20 *Agrimonia* 15, ...

Sanguisorbinae 7: 254 *Acaena* 60, *Bencomia*, *Cliffortia* 124, *Polylepis* 26, *Sanguisorba* 33 (incl. *Poterium*°), ...

Acaena argentea × *Margyricarpus*° (*Acaena*) *digynus* IS *Sanguisorbinae* (→ × *Margyracaena* Bitter 1921 in Fedde Repert. 17, 239) (nat. hyb.) IK 1929, Knobloch 1972, Willis 1985, Crawford et al. 1993, AP website 2026

Bencomia caudata × *Sanguisorba minor* *Sanguisorbinae* Santos–Guerra 1983

Bencomia × *Dendriopoterium*° (*Bencomia*, *Sanguisorba*) IS *Sanguisorbinae* (art. hyb.) Bramwell 1978, see Helfgott et al. 2000

Bencomia × *Marcetella*° (= *Bencomia*) IS *Sanguisorbinae* (art. hyb.) Bramwell 1978, see Helfgott et al. 2000

Ulmarieae 1: 10

meadowsweet and allies = Mädesüß

Filipendula 10.

Probably **basic type Rosaceae Rosoideae tribe Ulmarieae (*Filipendula*) (1: 10)**: This tribe is well-defined by its flowers and fruits. According to Chen et al. 2020) it represents a molecularly strongly supported clade within subfamily Rosoideae. 2 interspecific hybrids connect the ten species.

IS: POWO (2026) *Filipendula* 2 IS.

References:

- Asker S (1970) An intergeneric *Fragaria* × *Potentilla* hybrid. Hereditas 64, 135–139. *Fragaria moschata* × *Dasiphora fruticosa*
- Agroforestry (2025) https://www.agroforestry.co.uk/wp-content/uploads/site-files-pdf/AGN_sample.pdf photos of several hybrids of tribe Maleae
- Asker S (1971) Some viewpoints on *Fragaria* × *Potentilla* intergeneric hybridization. Hereditas 67, 181–190. *Fragaria moschata* × *Dasiphora fruticosa*
- Baker MA et al. (1984) On *Cowania* and its intergeneric hybrids in Arizona USA. Great Basin Naturalist 44, 484–486. www.jstor.org/stable/41712101
- Bell R & Hough LF (1986) Interspecific and intergeneric hybridization of *Pyrus*. Hort. Science 21, 62–64.
- Bitter G (1921) Ein Gattungsbastard zwischen *Acaena* und *Margyricarpus*: *Margyracaena*. Feddes Rep. Spec. Nov. Reg. Veg. 17, 239–243.
- Bramwell (1978) The endemic genera of Rosaceae (Poterieae) in Macaronesia. Botánica Macaronésica 6, 67–73.
- Browicz K (1970) „*Malus florentina*“, its history, systematic position and geographical distribution. Fragm. Flor. Geobot. 16, 61–83.
- Byatt JI, Ferguson I & Murray BG (1977) Intergeneric hybrids between *Crataegus* L. and *Mespilus* L.: A fresh look at an old problem. Bot. J. Linn. Soc. 74, 329–344.
- Challice JS & Kovanda M (1978) Flavonoids as markers of taxonomic relationships in the genus *Sorbus* in Europe. Preslia 50, 305–320.
- Chen X et al. (2020) Molecular systematics of Rosoideae (Rosaceae). Plant Syst. Evol. 306, 9. <https://doi.org/10.1007/s00606-020-01629-z>
- Chin SW et al. (2014) Diversification of almonds, peaches, plums and cherries—molecular systematics and biogeographic history of *Prunus* (Rosaceae). Molec Phylogen Evol 76, 4–48. <https://doi.org/10.1016/j.ympev.2014.02.024>. tribe Amygdaleae phylogeny
- Connolly BA (2009) × *Sorbaronia fallax* (Rosaceae): A new record of an intergeneric hybrid in Connecticut. Rhodora 111 (945), 123–125.
- Coombes A et al. (2007) × *Rhaphiobotrya*, a new intergeneric hybrid in Rosaceae and the identity of Coppertone Loquat. Illinois Natural History Survey Research Projects, In the Context of the Survey's Strategic Plan, Fiscal Year 2008 www.inhs.uiuc.edu/annualreports/06_07/Projs07.pdf,

- published: (2008) *Plantsman* n.s. 7 (3), 164.
- Crawford DJ et al. (1993) Use of RAPD markers to document the origin of the intergeneric hybrid $\times$ *Margyraceaena skottsbergii* (Rosaceae) on the Juan Fernandez Islands. *Amer J. Bot.* 80, 89–92.
- Czerepanov SK (1995) *Vascular plants of Russia and adjacent states (the former USSR)*. Cambridge: Cambridge University Press.
- Chen X et al. (2020) Molecular systematics of Rosoideae (Rosaceae). *Plant Syst. Evol.* 306, 9.
<https://doi.org/10.1007/s00606-020-01629-z>
- Ding Y et al. (2019) De novo assembled transcriptome analysis and identification of genic SSR markers in red-flowered strawberry. *Biochemical Genetics Epub.* 2019 Mar 01.
- Düll R (1959) *Unsere Ebereschen und ihre Bastarde* Die Neue Brehm-Bücherei, Heft 226. Wittenberg: Ziemsen.
- Düll R (1961) Die *Sorbus*-Arten und ihre Bastarde in Bayern und Thüringen. *Ber. Bayer. Bot. Ges.* 34, 11–65.
- Egolf DR & Drechsler RF (1967) Chromosome numbers of *Pyracantha* [Rosaceae]. *Baileya* 15, 82–88.
- Ellis JR (1962) *Fragaria-Potentilla* intergeneric hybridization and evolution in *Fragaria*. *Proc. Linn. Soc. London* 173, 99–106.
- Fischer TC et al. (2014) F-1 hybrid of cultivated apple (*Malus* $\times$ *domestica*) and European pear (*Pyrus communis*) with fertile F-2 offspring. *Molecular Breeding* 34 (3), 817–828.
- Gonai T et al. (2006) Overcoming hybrid lethality in a cross between Japanese pear and apple using gamma irradiation and confirmation of hybrid status using flow cytometry and SSR markers. *Sci. Hort.* 109 (1), 43–47.
- Göpffarth J (1995) *Zur Morphologie und Systematik der Steinobstgewächse (Rosaceae, Unterfamilie Prunoideae)*. Staatsexamensarbeit unveröff., Universität Hamburg, Fachbereich Biologie.
- Grower IG & Search RE (1993) *Fragentalus* $\times$ *dalhancockianus* gen. & sp. nov. – shrubby Macintosh apple strawberry. *Acta Hort.* 348, 142–145.
http://www.actahort.org/members/showpdf?booknrarnr=348_17 this is a joke!
- Grushin AA et al. (1986) Study of isoperoxidases of quince and of its intergeneric hybrid. [Russian] *Fiziologiya i Biokhimiya Kul'Turnykh Rastenii* 18, 343–347. *Cydonia* $\times$ *Malus*
- Guillaumin A (1945) Hybrides de greffe et hybrides sexuels. *Compt. Rend. Acad. Sci. Paris* 221, 572–574.
- Haussknecht K (1902) Geschichte und Vorkommen der Hahnbuttenbirne. *Mitt. Thüring. Bot. Ver.* 17, 102–105. *Aria edulis nivea* (= *Sorbus aria*) $\times$ *Pyrus communis*
- Hedlund T (1901) *Monographie der Gattung Sorbus*. Kongl. Svensk. Vetensk.-Akad. Handl. 35 (1), 1–147.
- Helfgott DM et al. (2000) Biogeography and breeding system evolution of the woody *Bencomia* alliance (Rosaceae) in Macaronesia based on ITS sequence data. *Syst. Bot.* 25 (1), 82–97.
- Inoue E et al. (2003) Effect of high-temperature on suppression of the lethality exhibited in the intergeneric hybrid between Japanese pear (*Pyrus pyrifolia* Nakai) and apple (*Malus* $\times$ *domestica* Borkh.). *Scientia Horticulturae* 98 (4) 385–396.
- Jelenkovic G et al. (1984) An evaluation of intergeneric hybridization of *Fragaria* spp. $\times$ *Potentilla* spp. as a means of haploid production. *Euphytica* 33, 143–152.
- Junker R (1993) Die Gattungen *Geum* (Nelkenwurz), *Coluria* und *Waldsteinia* (Rosaceae, Tribus Geeae). pp. 95–111 in Scherer S (ed.) *Typen des Lebens*. Berlin: Pascal.
- Junker R (2025) The genera *Geum* (avens), *Coluria*, and *Waldsteinia* (Rosaceae, Tribe Geeae). In Sanders RW (ed.) *Basic types of life*. Tulsa, Oklahoma: Blyth Institute Press, pp. 131–151.
[translation of the German edition 1993](#)
- Kárpáti Z (1960) Die *Sorbus*-Arten Ungarns und der angrenzenden Gebiete. *Feddes Rept.* 62, 71–334.
- Koidzumi (1934) *Contributiones ad floram Asiae orientalis*. *Acta Phytotax. Geobot.* 3, 146–162.
http://ci.nii.ac.jp/els/110003761650.pdf?id=ART0004973359&type=pdf&lang=en&host=cinii&order_no=&ppv_type=0&lang_sw=&no=1325524681&cp *Aria* $\times$ *Sorbus*

- Kutzelnigg H (1993) Verwandtschaftliche Beziehungen zwischen den Gattungen und Arten der Kernobstgewächse (Rosaceae, Unterfamilie Maloideae). pp. 113–127 in Scherer S (ed.) Typen des Lebens. Berlin: Pascal. = “[Relationships among the genera and species of the pome-fruited plants \(Rosaceae, subfamily Maloideae\)](#)”
- Kutzelnigg H (1994) Maloideae. pp. 250–273 in: Hegi G (ed.) Illustrierte Flora von Mitteleuropa IV/2B. Berlin: Blackwell.
- Kutzelnigg H (2003) Neues zur Systematik und Evolution der Kernobstgewächse (Rosaceae: Maloideae). Stud. Integr. J. 10, 32–34. [New aspects of the systematics and evolution of the pome-fruited plants. This paper includes the question, if genera *Gillenia*, *Kageneckia*, *Vauquelinia* and *Lindleya* are part of the basic type of pome-fruited plants](#)
- Kutzelnigg H (2025) Relationships among the genera and species of the pome-fruited plants (Rosaceae, subfamily Maloideae). In Sanders RW (ed.) Basic types of life. Tulsa, Oklahoma: Blyth Institute Press, pp. 153–175. [translation of the German edition 1993, updated 2009!](#)
- Kyle NE et al. (1986) Micrografting between N-fixing and non-N-fixing genera of the Rosaceae. Bot. Gaz. 147 (3): 243–246.
- Li Q-Q et al. (2024) Plastid phylogenomics of the tribe Potentilleae (Rosaceae) <https://doi.org/10.1016/j.ympev.2023.10796>
- Likhonos et al. (1983) see: Vitkovskiy & Korovina (Semeckovye (jablonja, grusa, ajva pome fruits). In: Kulturnaja flora = Flora of cultivated plants SSSR 14, Moskva).
- Liu BB et al. (2019) Phylogenomic analyses of the *Photinia* complex support the recognition of a new genus *Phippsiomeles* and the resurrection of a redefined *Stranvaesia* in Maleae (Rosaceae). J. Syst. Evol. 57, 678–694. <https://doi.org/10.1111/jse.12542>
- Loos GH (2010) Taxonomische Neukombinationen zur Flora Mittel- und Osteuropas, insbesondere Nordrhein-Westfalens / New taxonomic combinations within the flora of central and eastern Europe, especially North Rhine-Westphalia. Jahrb. Bochum. Bot. Ver. 2 (1), 1–20. http://www.botanik-bochum.de/html/publ/OVBBV2-1_Loos_TaxonomischeAenderungen.pdf
- Mabberley DJ (2002) *Potentilla* and *Fragaria* (Rosaceae) reunited. Telopea 9 (4), 793–801.
- Macfairlane Smith WH & Jones JK (1985a) Intergeneric crosses with *Fragaria* and *Potentilla*. I. Crosses between *Fragaria moschata* and *Potentilla fruticosa*. Euphytica 34, 725–735.
- Macfairlane Smith WH & Jones JK (1985b) Intergeneric crosses with *Fragaria* and *Potentilla*. II. Crosses between the progeny of *Fragaria moschata* × *Potentilla fruticosa* and the original parents. Euphytica 34, 737–744.
- Májovský J & Bernátová D (2001) Nové hybridogénne podrody rodu *Sorbus* L. emend. Crantz. Acta Hort. et Regiotect. 1, 20–21.
- Mangelsdorf AJ & East EM (1927) Studies on the genetics of *Fragaria*. Genetics 12, 307–339. [Fragaria vesca × Potentilla nepalensis](#)
- Marta AE et al. (2004) Breeding barriers between the cultivated strawberry, *Fragaria* × *ananassa*, and related wild germplasm. Euphytica 136 (2), 139–150.
- Meyer N et al. (2005) Beiträge zur Gattung *Sorbus* in Bayern. Ber. Bayer. Bot. Ges., Sonderband.
- Mezhenskyj VM (2009) A new intergeneric hybrid × *Cydolus rudenkoana* Mezhenkyj (Rosaceae Juss.) [Ukrainian]. Introduktzija roslyn (Kyiv) 4, 42–44. http://www.mezhenskyjv.narod.ru/article_scientific/intr_4_2009.pdf
- Mezhenskyj VM (2013) http://www.mezhenskyjv.narod.ru/rus_page_4.htm
- Nelson-Jones E, Briggs D & Smith A (2002) The origin of intermediate species of the genus *Sorbus*. Theoretical & Applied Genetics 105 (6/7), 953–963.
- Nikolaeva MG & Rotaru GI (1979) Morphological and anatomical characteristics of a natural intergeneric hybrid between the Cherry plum and the apricot. [Russian] Izvestiya Akademii Nauk Moldavskoi SSR Seriya Biologicheskikh i Khimicheskikh Nauk 1979 (3), 8–16.
- Niemirowicz-Szczytt (1985) The results of intergeneric pollination of *Fragaria* × *ananassa* Duch. and *Fragaria virginiana* Duch. by *Potentilla* species. Acta Hort. 159, 95. http://www.actahort.org/books/159/159_17.htm
- Phipps JB et al. (1990) A checklist of the subfamily Maloideae Rosaceae. Canad. J. Bot. 68 (10),

2209–2269.

- Pojarkova AI (1953) $\times$ *Sorbocotoneaster* Pojark. hybrida intergenerica nova naturalis. Mater. Gerb. Bot. Inst. Komarov Akad. Nauk SSSR 15, 92–108.
- Postman JD (1996) *Sorbopyrus auricularis* (Knoop) Schneider – an unusual pear relative. Fruit Varieties Journal 50, 218–220.
- Postman JD (2011) Intergeneric hybrids in Rosaceae subtribe Pyrinae (formerly subfamily Maloideae) at USDA genebank. Acta Horticulturae. 918, 937–943.
- Potter D et al. (2007) Phylogeny and classification of Rosaceae. Plant Syst. Evol. 266, 119–145. <https://doi.org/10.1007/s00606-007-0539-9>
- Proctor MCF et al. (1989) Evidence from peroxidase polymorphism on the taxonomy and reproduction of some *Sorbus* populations in southwest England. Ne Phytol. 112, 569–575.
- Putov VS (1982) *Aflautunia ulmifolia* in plum breeding for resistance to damping-off. [Russian] Sel'Skokhozyaistvennaya Biologiya 17, 470–473.
- Putov VS & Sankina AS (1985) Outlook for the use of spontaneous plum polyploids of varying genetic origin. [Russian] Sel'Skokhozyaistvennaya Biologiya (4), 29–33.
- Qian GZ et al. (2008) Taxonomic study of *Malus* section *Florentinae* (Rosaceae). Bot. J. Linnean Soc. 158 (2), 223–227.
- Robertson KR (1974) The genera of Rosaceae in the Southeastern United States. J. Arnold Arbor. 55, 303–401, 611–662.
- Robertson KR et al. (1991) A synopsis of genera in Maloideae (Rosaceae). Syst. Bot. 16, 376–394.
- Santos-Guerra A (1983) Vegetación y flora de La Palma. Editorial Interinsular Canaria, Santa Cruz de Tenerife, Canary Islands, Spain.
- Sayegh AJ & Hennerty MJ (1993) Intergeneric hybrids of *Fragaria* and *Potentilla*. Acta Horticulturae 348, 151–154. *Fragaria ananassa* $\times$ *Potentilla* (= *Dasiphora*) *fruticosa*
- Senanayake YDA & Bringhurst RS (1967) Origin of *Fragaria* polyploids. I. Cytological analysis. Am. J. Bot. 54, 221–228. *F. chiloensis* $\times$ *P. glandulosa*
- Shaw JMH (2015) Nomenclatural notes on horticultural hybrids: *Dahlia* ‘Mexican Black’, *Potentilla* and other Rosaceae, *Stylophorum*, and *Tigridia*. Phytoneuron 2015–53, 1–5.
- Shcherbenev GYA (1975) Characteristics of the hybrid offspring of quince and apple. [Russian]. S-KH Biol. 10, 308–310.
- Shimura I et al. (1980) Intergeneric hybridization between Japanese pear (*Pyrus serotina* var. *culta*) and apple (*Malus pumila* var. *domestica*). [Japanese] Japanese Journal of Breeding 30, 170–180.
- Shin YU et al. (1989) Studies on the intergeneric hybridization between apple and pear. [Korean] Research Reports of the Rural Development Administration (Suweon) 31 (2 Hortic.), 9–14.
- Silva T (1990) Intergeneric hybridisation between *Fragaria vesca* and *Potentilla fruticosa*. University of Reading. PhD thesis.
- Silva T & Jones JK (1996) In vitro production and propagation of *Fragaria vesca* $\times$ *Potentilla fruticosa* hybrids. Plant Cell Tissue and Organ Culture 46, 51–58.
- Smedmark JEE & Eriksson T (2006) Early stages of development shed light on fruit evolution in allopolyploid species of *Geum* (Rosaceae). Int. J. Plant Sci. 167 (4), 791–803.
- Smedmark JEE et al. (2003) Ancient allopolyploid speciation in Geinae (Rosaceae): Evidence from nuclear granule-bound starch synthase (GBSSI) gene sequences. Syst. Biol. 52, 374–385. <http://www.informaworld.com/smpp/content~content=a713850244~db=all~order=page>.
- Squirrel J et al. (2005) Cell lines and plants obtained after protoplast fusion of *Rosa* + *Rosa*, *Rosa* + *Prunus* and *Rosa* + *Rubus*. Euphytica 146 (3), 223–231.
- Stutz HC & Thomas LK (1964) Hybridization and introgression in *Cowania* and *Purshia*. Evolution 18 (2), 183–195. <http://www.jstor.org/pss/2406391>
- Sun et al. (2024) Phylogeny of genera in Maleae (Rosaceae) based on chloroplast genome analysis. Frontiers in Plant Science. <https://doi.org/10.1007/s00606-007-0539-9>
- Trabut L (1916) *Pyronia*. J. Hered. 7, 416–419.
- Vitkovskiy VL & Korovina ON (eds) (1983). Pome fruits (apple, pear, quince). Vol. 14 of Likhonos FD, Tuz AS & Lobachev AJ (eds) Flora of cultivated plants. Moskva, Russia.

- Volotovskiy KA & Kuznetsova LV (1998) New data on the natural intergeneric hybrid
 × *Sorbocotoneaster pozdnjakovii* (Rosaceae). Bot. Zhurnal Moskva then Sankt Peterburg 83, 94–103.
- Wang H et al. (2024). Refining the phylogeny and taxonomy of the apple tribe Maleae (Rosaceae): Insights from phylogenomic analyses of 563 plastomes and a taxonomic synopsis of *Photinia* and its allies in the Old World. PhytoKeys 242, 161–227. <https://doi.org/10.3897/phytokeys.242.117481>
- Warburg EF & Kárpáti Z (1968) *Sorbus* L. In Tutin TG et al. (eds) Flora Europaea 2, 67–71.
- Weber C (1964) The genus *Chaenomeles* (Rosaceae). J. Arnold Arbor. 45, 161–206, 302–345.
<http://www.botanicus.org/item/31753003542112#>
- Wenzig T (1874) Pomarieae Lindley. Linnaea 38, 1–206. Charaktere der Gattungen und Arten. Jahrb. Königl. Bot. Garten Berlin 2, 287–307.
- Yenikeyev KK (1938) A cyto-genetical study of the intergeneric hybrid „*Cerapadus*”. Genetika 20 (1–2), 187–216.

Rubiaceae (Gentianales) 615: 14200. (1 IG)

madder family = Rötengewächse

Valuable list: https://en.wikipedia.org/wiki/List_of_Rubiaceae_genera

2 subfamilies, 72 tribes.

Dialypetalanthoideae 400: 6100

42 tribes, e.g. Coffeae, ...

Coffeae 12: 311

Coffea div. spec. × *Psilanthopsis*^o *kapakata* (= *Coffea* p.p.) IS Carvalho 1959, Knobloch 1972

Coffea arabica × *Psilanthus*^o (= *Coffea*) *ebracteolatus* IS Couturon et al. 1998

IS: POWO (2026) *Coffea* 6 IS, see also Junker 1999, Couturon et al. 1998.

Rubioideae 207: 8100

30 tribes, e.g. Psychotrieae 1: 1900! (*Psychotria*), Rubieae 17: 1004, ...

Rubieae 17: 1004. 1 IG

Monophyletic.

Asperula (incl. *Cynanchica*^o) 170, *Cruciata* 8, *Galium* 650, *Rubia* 80, *Sherardia* 1, *Thliphthisa* 22 (since 2020, formerly section of *Asperula*), ...

Possibly **basic type Rubiaceae subfamily Rubioideae tribe Rubieae (17: 1004)** as a well-defined monophyletic clade with closely related genera, see e.g. Ehrendorfer et al. (2018).

IS: POWO (2026): *Asperula* 1 IS, *Galium* 28 IS, ...

“*Asperula*” × *Galium* There are 3 nothospecies of this type, but due to nomenclatural changes 2 of them are now interspecific within *Galium*, and a third (see below) has been renamed.

1. IS (→ × *Galiasperula*^o Ronniger 1931 in Fedde Repert. 29, 143. (“*Asperula humifusa*” (= *Galium humifusum*) × *Galium verum* → x^o*Galiasperula*^o *himmelbaurianum* Ronniger 1931, nat. hyb. S-E Europe; = *Galium* x^o*himmelbaurianum* (Ronniger) Soó.

2. IS (→ × *Asperugaliu*^o P. Fournier 1938 Quatre Fl. France “*Asperula glauca*” (= *Galium glaucum*) × *Galium mollugo* → × *Asperugaliu*^o *fictum* (E. G. Camus) P. Fournier; = *Galium* × *fictum* E. G. Camus 1903, IK 1938, Knobloch 1972, Willis 1985

Galium × *Thliphthisa* (“*Asperula*”) (→ × *Galiphthisa* Feng et al. 2024 (*Galium degenii* × *Thliphthisa purpurea* → × *Galiphthisa ferdinandi-coburgii*; = “*Galium* × *ferdinandi-coburgii*” J. Wagner 1935 (nat. hyb. Greece)

References:

- Carvalho A (1959) Genetica de *Coffea*. XXIV. Mutantes de *Coffea arabica* procedentes da Etiopia. Bragantia (Campinas), 18 (25), 353–371.
- Couturon E et al. (1998) First intergeneric hybrids (*Psilanthus ebracteolatus* Hiern × *Coffea arabica* L.) in coffee trees. Canad. J. Bot. 76 (3), 542–546.
- Ehrendorfer F et al. (2018) Phylogeny, character evolution and spatiotemporal diversification of the species-rich and world-wide distributed tribe Rubieae (Rubiaceae). Plos One. <https://doi.org/10.1371/journal.pone.0207615>
- Junker R (1999) Kaffee (*Coffea*): Sternförmige Radiation. Studium Integrale J. 6 (1).

Rutaceae (Sapindales) 161: 2085. (3 IG)

rue or citrus family = Rautengewächse

7 subfamilies:

Amyrioideae, Aurantioideae 27: 206, Cneoroideae, Hyplophyllloideae, Rutoideae, Spathelioideae, Zanthoxyloideae (= Toddalioideae) (e.g. *Dictamnus*).

IS: POWO 2026: *Adenandra* 1 IS, *Citrus* 4 IS, *Correa* 2 IS, *Melicope* 1 IS.

Aurantioideae = Citroideae 27: 206. 3 IG

Aegle, *Atalantia* (incl. *Severinia*°), *Citropsis*, *Citrus* (incl. *Clymenia*°, *Eremocitrus*°, *Feroniella*°, *Fortunella*°, *Microcitrus*°, *Poncirus*°) 30, *Bergera*, *Clausena*, *Glycosmis* 50, *Limnocitrus*, *Naringi*, *Severinia* (or part of *Atalantia*), *Triphasia*, ...

For a list of taxa, see: http://www.ars-grin.gov/npgs/acc/acc_queries.html, „Citrus relatives and their hybrids“ <http://www.citrusvariety.ucr.edu/citrus/relatives.html>, „Walter Swingle’s complete list of the subfamily Aurantioideae“ <http://www.citrusvariety.ucr.edu/citrus/citrus.html>, <http://de.wikipedia.org/wiki/Rautengewächse> and „Das Citrus online Buch“ <http://www.steffenreichel.homepage.t-online.de/Citrus/> = www.citrus-online.de

Possibly **basic type Rutaceae subfamily Aurantioideae** (27: 206). The subfamily is monophyletic with closely related genera, see Morton (2008), see the figure below. Most former intergeneric hybrids are now considered to be interspecific.

– There are two problems in evaluating the basic type situation: i. The hybrids have often been only achieved by somatic hybridization via cell fusion, so that it is difficult to decide if they really are symmetric. ii. The present phylogenies differ much from one another.

Atalantia × *Citrus* Louzada et al. 1993 (SO symmetric, cytologically controlled), Motumura et al. 1995 SO symmetric?

Citropsis schweinfurthii × *Citrus* Grosser et al. 1990 (SO), Yahata et al. 2006 (sexual hybrids!), Smith et al. 2013 (fruiting!)

Citrus sinensis × *Clausena lansium* Guo & Deng 1999 (SO, symmetric, 2n = 6x), Fu et al. 2003 (SO)

Citrus × *Clymenia*° × *Fortunella*° IS (→ × *Coleara* ined.)

http://cnas.ucr.edu/~citrus/Accession/mis_notcitrus.htm

Citrus × *Eremocitrus*° *glauca* IS (→ × *Citremocitrus* ined.) Knobloch 1972,

<http://www.citrusvariety.ucr.edu/citrus/relatives.html> ,

<http://de.wikipedia.org/wiki/Rautengewächse>

Citrus × *Eremocitrus*° × *Poncirus*° IS Knobloch 1972

Citrus × *Feroniella*° Takayanagi et al. 1992 SO (plantlets with genomes of both parents)

Citrus div. spec. × *Fortunella*° IS (→ × *Citrofortunella* J. Ingram & H. E. Moore 1975 Bailey 19 (4): 169) (≥3 nothospecies) Knobloch 1972, Deng et al. 1992 (SO, symmetric), Zander 2008

Citrus × *Fortunella*° × *Microcitrus*° *australasica* IS (→ × *Microcitronella* ined.) Swingle & Reece 1967, <http://de.wikipedia.org/wiki/Rautengewächse>

Citrus sinensis × *Fortunella*^o *margarita* × *Poncirus*^o *trifoliata* IS (→ × *Fortucitroncirus* ined.) Knobloch 1972, <http://de.wikipedia.org/wiki/Rautengewächse>, <http://itp.lucidcentral.org/id/citrus/citrusid/key/Citrus/Media/Html/Citranguequat.htm>

Citrus × *Microcitrus*^o IS (→ × *Citromicrocitrus* ined.) SO symmetric Rahman & Nito 1994a

Citrus div. spec. × *Poncirus*^o *trifoliata* IS (→ × *Citroncirus* J. Ingram & H. E. Moore 1975 Bailey 19 (4): 171) (e.g. *C. sinensis* × *P. trifoliata* = *Citrangue*; *C. paradisi* × *P. trifoliata* = *Citrumelo*; *C. reticulata* × *P. trifoliata* = *Citrandarini*; *C. limonia* × *P. trifoliata* = *Citremon*) Knobloch 1972, Rahman & Nito 1994b, Rajasekharan et al. 1995, Zander 2008

Citrus × *Severinia*^o *buxifolia* (= *Atalantia* p.p.) Motomura et al. 1995 SO, Medina Filho et al. 1998 (sex. hyb.), cf. *Atalantia* × *Citrus*

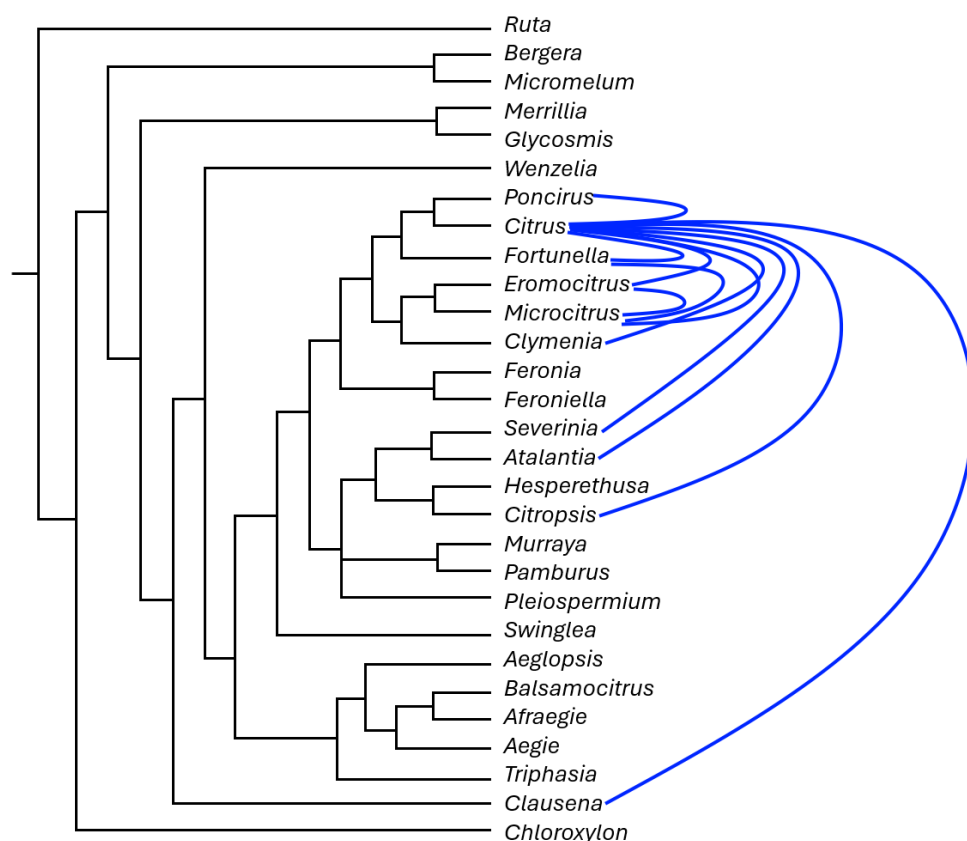
Citrus × *Swinglea* Takayanagi et al. 1992 SO → asymmetric? (plantlets with genomes of both parents)

Eremocitrus^o (*Citrus*) *glauca* × *Microcitrus*^o (*Citrus*) *inodora* IS SO Rahman & Nito 1994b

Fortunella^o (*Citrus*) *margarita* × *Microcitrus*^o (*Citrus*) *warburgiana* IS SO Rahman & Nito 1994b, <http://www.citrusvariety.ucr.edu/citrus/faustrimedini.html>

Fortunella^o (*Citrus*) × *Poncirus*^o (*Citrus*) IS Knobloch 1972

Microcitrus^o (*Citrus*) × *Poncirus*^o (*Citrus*) IS (→ × *Microcirus* ined.) <http://de.wikipedia.org/wiki/Rautengewächse>



Rutaceae subfamily Aurantioideae: hybrid connections in the phylogeny of Morton (2008. https://www.gfbs-home.de/fileadmin/user_upload/ode2mods/ode/ode09/ode09_000052/article.pdf)

References:

- Agarwal PK (1987) Cytogenetical Investigations in Rutaceae II. Meiotic studies in three intergeneric hybrids of *Citrus*. Cytologia (Tokyo) 52 (4), 757–760. *Citrus* × *Poncirus*, *Citrus* × *Fortunella*
- Agarwal PK (1989) Cytogenetical investigations in Rutaceae V. Cytomorphology of three intergeneric hybrids of *Citrus* and *Poncirus*. Cytologia (Tokyo) 54 (4), 705–708.
- Brasileiro-Vidal AC et al. (2007) A simple chromosomal marker can reliably distinguish *Poncirus*

- from *Citrus* species. *Genetica* 129 (3), 273–279. *Citrus × Poncirus*
- Carbonell-Caballero J et al. (2015) A phylogenetic analysis of 34 chloroplast genomes elucidates the relationships between wild and domestic species within the genus *Citrus*. In: *Mol Biol Evol.* [important paper, showing that all Citrus-fruits have a common ancestor](#)
- Deng XX et al. (1992) Intergeneric somatic hybrid plants from protoplast fusion of *Fortunella crassifolia* cultivar Meiwa with *Citrus sinensis* cultivar Valencia. *Scientia Horticulturae* 49, 55–62.
- Fu CH et al. (2003) Regeneration of *Citrus sinensis* (+) *Clausena lansium* intergeneric triploid and tetraploid somatic hybrids and their identification by molecular markers. *In vitro Cell. Developm. Biol. Plant* 39, 360–364.
- Grosser JW et al. (1988a) Intergeneric somatic hybrid plants of *Citrus sinensis* cultivar Hamlin and *Poncirus trifoliata* cultivar Flying Dragon. *Plant Cell Reports* 7 (1), 5–8.
- Grosser JW et al. (1988b) Intergeneric somatic hybrid plants from sexually incompatible woody species *Citrus sinensis* and *Severinia disticha*. *Theoretical & Applied Genetics* 75 (3), 397–401.
- Grosser JW et al. (1990) Somatic hybrid plants from sexually incompatible woody species *Citrus reticulata* and *Citropsis gillettiana*. *Plant Cell Reports* 8, 656–659. [SO, but also sexual hybrids have been achieved](#)
- Guo W-W & Deng X-X (1999) Intertribal hexaploid somatic hybrid plants regeneration from electrofusion between diploids of *Citrus sinensis* and its sexually incompatible relative, *Clausena lansium*. *Theoretical & Applied Genetics* 98, 581–585. *Citrus × Clausena SO symmetric.* <http://link.springer-ny.com/cgi-bin/ivw/CP/data/jour/jour/00122/bibs/9098003/90980581.htm>
- Guo WW & Deng XX (2001) Wide somatic hybrids of *Citrus* with its related genera and their potential in genetic improvement. *Euphytica* 118 (2), 175–183. [Gene transfer und method.](#)
- Louzada ES et al. (1993) Intergeneric somatic hybridization of sexually incompatible parents: *Citrus sinensis* and *Atalantia ceylanica*. *Plant Cell Reports* 12, 687–690. <http://www.springerlink.com/content/q8973250p0608g00/fulltext.pdf>
- Medina Filho HP, Bordignon R & Ballve RML (1998) Sunkifolias and buxisunkis: Sexually obtained reciprocal hybrids of *Citrus sunki* × *Severinia buxifolia*. *Genetics Molec. Biology* 21, 129–133.
- Morton (2008) Phylogenetic relationships of the Aurantioideae (Rutaceae) based on the nuclear ribosomal DNA ITS region and three noncoding chloroplast DNA regions, atpB-rbcL spacer, rps16, and trnL-trnF. *Organisms Diversity & Evolution.* https://www.gfbs-home.de/fileadmin/user_upload/ode2mods/ode/ode09/ode09_000052/article.pdf
- Motumura T et al. (1995) Intergeneric somatic hybrids between *Citrus* and *Atalantia* or *Severinia* by electrofusion, and recombination of mitochondrial genomes. *Breeding Science* 45, 309–314.
- Nagano Y et al. (2018) Phylogenetic relationships of Aurantioideae (Rutaceae) based on RAD-Seq. *Tree Genetics & Genomes* 14, 6. <https://doi.org/10.1007/s11295-017-1223-z>
- Rahman MM (1994) Genetic analysis of phosphoglucosomerase isozymes in true citrus–fruit trees. *Scientia Horticulturae* 60, 17–22.
- Rahman MM & Nito N (1994a) Phylogenetic relationships among the „true citrus fruit trees” by glutamate oxaloacetate transaminase isozymes analysis. *J. Jap. Soc. Hort. Sci.* 62, 755–760. <http://www.affrc.go.jp/agrolib/RN/0000057980.pdf>
- Rahman MM & Nito N (1994b) Use of glutamate Oxaloacetate transaminase isozymes for detection of hybrids among genera of the true citrus fruit trees. *Scientia Horticulturae* 58, 197–206. *Citrus × Eremocitrus, Fortunella × Microcitrus, Citrus × Poncirus sex. hyb.*
- Rajasekharan PE et al. (1995) Expression of trifoliolate leaf character in *Citrus limonia* × *Poncirus trifoliata* hybrids through cryostored pollen. *J. Hort. Sci.* 70, 485–490.
- Smith MW et al. (2013) First fruiting intergeneric hybrids between *Citrus* and *Citropsis*. *J. Amer. Soc. Hort. Sci.* 138 (1), 57–63.
- Swingle WT & Reece PC (1967) The botany of *Citrus* and its wild relatives.
- Takayanagi R et al. (1992) Regeneration of intergeneric somatic hybrids by electrical fusion between *Citrus* and its wild relatives Mexican lime *Citrus aurantiifolia* and Java feroniella *Feroniella lucida* or tabog *Swinglea glutinosa*. [Japanese] *J. Jap. Soc. Hort. Science* 60, 799–804.
- Tan ML et al. (2007) Production of two mandarin × trifoliolate orange hybrid populations via embryo

- rescue with verification by SSR analysis. *Euphytica* 157 (1–2), 155–160.
- Xu XY et al. (2004) Production and characterization of intergeneric diploid cybrids derived from symmetric fusion between *Microcitrus papuana* Swingle and sour orange (*Citrus aurantium*). *Euphytica* 136 (2), 115–123. *Citrus* × *Microcitrus* **SO** symmetric
<http://www.springerlink.com/content/p5857g7q55456417/fulltext.pdf>
- Yahata M et al. (2006) Production of sexual hybrid progenies for clarifying the phylogenetic relationship between *Citrus* and *Citropsis* species. *J. Amer. Soc. Horticult. Science* 131 (6), 764–769.

Salicaceae (incl. Flacourtiaceae) (Malpighiales) 53: 1200. (1 IG)

3 subfamilies:

Salicoideae 40: 961, Samydoideae 11: 235, Scyphostegioideae 2: 2.

Salicoideae 40: 961 (a small part of this subfamily is the former family Salicaceae)

6 tribes, e.g. Flacourtieae 14: 180, Saliceae 2: 664, ...

Saliceae 2: 664. **1 IG**

AP website 2026 lumps Saliceae with Flacourtieae. We follow the majority of authors who accept only *Populus* and *Salix* in this tribe and place the rest in Flacourtieae.

Populus 35, *Salix* 629 (incl. *Chosenia* I).

Probably **basic type Salicaceae Salicoideae tribe Saliceae** (2: 664). *Salix* is famous for the extremely high number of more than 200 interspecific hybrids, mostly natural hybrids. It is linked by several cases of hybridization with the other genus *Populus*.

IS: POWO (2026): *Populus* 24 IS, *Salix* 220 IS!

According to <https://academic.oup.com/plphys/article/201/4/kiag562/8750790> special techniques could overcome the hybridization barriers between the distant sections *Aigeros* and *Leuce*.

Chosenia^o (= *Salix* p.p.) *arbutifolia* × *Salix* **IS** Willis 1985

Chosenia^o (= *Salix* p.p.) *arbutifolia* × *Toisusu*^o (= *Salix* p.p.) *urbaniana* **IS** (→ × *Toisochosenia* Kimura 1936 in Sc. Rep. Tohoku Imp. Univ. Ser. IV. (biol.) 11, 247) (nat. hyb.) IK 1947, Knobloch 1972, Willis 1985, Czerepanov 1995 (nat. hyb. in Far East Asia), Ohashia et al. 2000

Populus div. spec. × *Salix* div. spec. Embryo rescue = EC Xu & Li 1990 (*P. simonii* × *S. matsudana*: embryos and seedlings), Zenkteler et al. (2005) (*P. lasiocarpa* × *S. viminalis*: embryos and seedlings), Ahmadi et al. 2010 (*P. caspica* × *S. aegyptica*), Bagniewska-Zadworna et al. 2010, 2011 (*P. div. spec.* × *S. viminalis*), Przyborowski et al. 2012 (*P. tremula* × *S. viminalis*), ...

References:

- Ahmadi A et al. (2010) Study of intergeneric hybridization possibility between *Salix aegyptica* and *Populus caspica* to achieve new hybrids. *Int. J. Plant Production* 4 (2), 143–147.
http://www.gau.ac.ir/Jm/Programs/JurnalMgr/VolumArticle/EN_146_6.pdf
- Bagniewska-Zadworna A et al. (2010) Cytological analysis of hybrid embryos of intergeneric crosses between *Salix viminalis* and *Populus* species. *Austral. J. Bot.* 58 (1), 42–48.
- Bagniewska-Zadworna A et al. (2011) A successful application of the embryo rescue technique as a model for studying crosses between *Salix viminalis* and *Populus* species. *Austral. J. Bot.* 59 (4), 382–392. <http://dx.doi.org/10.1071/BT10270>
- Nilsson NH (1954) Über hochkomplexe Bastardverbindungen in der Gattung *Salix*. *Hereditas* 40, 517–522.
- Ohashia H et al. (2000) The female plant of ×*Toisochosenia kamikotica* (Kimura) Kimura (Salicaceae). *Japanese J. Botany* 75, 98–103.
- Przyborowski JA et al. (2012) Evaluation of the yield potential and physicochemical properties of the biomass of *Salix viminalis* × *Populus tremula* hybrids. *Industrial Crops and Products* 36 (1), 549–

554. <http://www.sciencedirect.com/science/article/pii/S0926669011004456>

Xu H & Li W (1990) Experimental study on the embryology of the intergeneric cross between *Populus simonii* and *Salix matsudana*. [Chinese]. Forest Research 3, 29–33.

Zenkter M et al. (2005) Intergeneric crossability studies on obtaining hybrids between *Salix viminalis* and four *Populus species* – In vivo and in vitro pollination of pistils and the formation of embryos and plantlets. Trees structure and function 19 (6), 638–643. <http://dsvpozn.info/?q=mieszaniec-hybrid-wierzby-topoli>

Sapindaceae (incl. Hippocastanaceae and Aceraceae) (Sapindales) 144: **1925. (1 IG)**

soapberry family = Seifenkrautgewächse

4 subfamilies:

Dodonaeoideae 24: 140, Hippocastanoideae 5: 144, Sapindoideae 111: 1340, Xanthoceroideae 1: 1.

Hippocastanoideae 5: 146

2 tribes: Acereae 2: 130, Hippocastaneae 3: 17.

Acereae 2: 130

maple = Ahorn

Formerly family Aceraceae. Monophyletic.

Acer 130 (incl. *Dipteronia*°).

Probably **basic type Sapindaceae Hippocastanoideae tribe Acereae** (1: 130) as a distinct monogeneric clade with 10 interspecific hybrids.

IS: POWO (2026): *Acer* 10 IS.

Hippocastaneae 3: 17

horse-chestnuts = Rosskastanien

Formerly family Hippocastanaceae. Monophyletic.

Aesculus 13, *Billia* 3, *Handeliidendron* 1.

Probably **basic type Sapindaceae Hippocastanoideae tribe Hippocastaneae** (3: 17): the species of *Aesculus* are connected by some 7 interspecific hybrids.

IS: POWO (2026): *Aesculus* 5 IS (*flava* × *glabra*; *flava* × *pavia*; *flava* × *sylvatica*; *glabra* × *pavia*; *pavia* × *sylvatica*).

Interestingly, *A. hippocastanum* and *A. pavia* diverged some 47–67 Ma ago, but hybridize in cultivation. The hybrid has since undergone a whole-genome duplication and is now a separate fertile species *A. carnea*, see Upcott (1936), Du et al. (2019), <https://blog.annelida.de/2024/12/04/for-how-long-do-species-retain-the-ability-to-form-hybrids/>

flowering plants and, to my knowledge, the hybrid between the most divergent parents occurs in Horse-chestnut, *Aesculus*. In this genus, the European *Ae. hippocastanum* and North American *Ae. pavia* diverged some 47–67 Ma ago, but hybridize in cultivation (Du et al., 2020; Upcott, 1936; Xiang et al., 1998). Their hybrid has since undergone a whole-genome duplication and thereby become a separate, fertile species, *Ae. carnea*, which is frequently cultivated as an ornamental tree.

Sapindoideae 111: 1340

26 tribes, e.g. *Nephelieae* 16: 100

Nephelieae 16: 10. **1 IG**

Blighia 3, *Dimocarpus* 6, *Litchi* 1, *Nephelium* 16, ...

Litchi chinensis × *Dimocarpus longan* *Nephelieae* Mcconchie et al. 1994, Zhao et al. 2008.

Global Times 2025 <https://www.globaltimes.cn/page/202606/1363433.shtml>: China develops world's first litchi-longan hybrid variety (bearing fruits).

References:

Du Z-Y et al. (2019) Phylogenomics, co-evolution of ecological niche and morphology, and historical biogeography of buckeyes, horsechestnuts, and their relatives (Hippocastaneae, Sapindaceae) and the value of RAD-Seq for deep evolutionary inferences back to the Late Cretaceous.

<https://doi.org/10.1016/j.ympev.2019.106726>

Mcconchie CA et al. (1994) Intergeneric hybridisation between litchi (*Litchi chinensis* Sonn.) and longan (*Dimocarpus longan* Lour.). *Ann. Bot. (London)* 74, 111–118.

Upcott M (1936) The parents and progeny of *Aesculus carnea*. *Journ. of Genetics* 33, 135–149.

<https://doi.org/10.1007/BF03027607>

Van Buren R et al. (2011) Longli is not a hybrid of Longan and Lychee as revealed by genome size analysis and trichome morphology. *Trop. Plant Biol.* 4, 228–236.

<https://link.springer.com/article/10.1007/s12042-011-9084-3> *Dimocarpus confinis* is not the result of a cross between *Dimocarpus longan* and *Litchi chinensis*.

Zhao YH et al. (2008) Inter-generic hybrids obtained from cross between litchi and longan cultivars and their molecular identification. *J. Fruit Sci.* 25 (6), 950–952.

Sarraceniaceae (Ericales) 3: 32

trumpet pitchers and allies = Schlauchpflanzengewächse

Carnivorous.

Excl. *Roridulaceae* (*Roridula*).

No subdivision.

Darlingtonia 1, *Heliamphora* 23, *Sarracenia* 8.

IS: POWO (2026): *Sarracenia* 20 **IS**.

Saxifragaceae (excl. Grossulariaceae) (Saxifragales) 41: 855. (8 IG)

saxifrage family = Steinbrechgewächse

10 tribes:

Saxifrageae 1: 561, Darmereae 6: 19, Heuchereae 16: 83, ...

Darmereae 6: 19. **2 IG**

Well-supported tribe.

Astilboides, *Bergenia*, *Darmera*, *Mukdenia* 1, *Oresitrophe* 1, *Rodgersia* 5, ...

Bergenia × *Mukdenia* (→ × *Mukgenia* Gress 2014 in *Garden* (London) 139, 8) (art. hyb.), IPNI 2026.

POWO 2026. The hybrid is available at the plant market

Mukdenia × *Oresitrophe* (→ × *Oreden* J. Nilson. 2024 U.S. Plant Patent PP362243), IPNI 2026,

Walters *Garden* 2025 (art. hyb.). Closely related sister genera. The hybrid is available at the plant market

Rodgersia × *Tellima* **IT** (→ × *Rodgerstellima*) unconfirmed report in *pinterest* 2026

Heuchereae 16: 83. **6 IG**

Monophyletic. Well-supported tribe.

Conimitella, *Heuchera* 43, *Holmiea*, *Mitella*, *Ozomelis*, *Lithophragma*, *Tellima* 1, *Tiarella*, *Tolmiea*, ...

Probably **basic type Saxifragaceae tribe Heuchereae** (16: 83). At least 6 intergeneric hybrids connect a large proportion of the genera, including the most distant genera in the phylogeny of Folk et al. 2023.

Conimitella × *Mitella* (nat. hyb. Wyoming, *C. williamsii* × *M. stauropetala*) Soltis & Soltis 1986, Soltis & Kuzoff 1995

Heuchera × *Mitella* see Soltis & Kuzoff 1995

Heuchera × *Tolmiea menziesii* see Soltis & Kuzoff 1995

Heuchera × *Tiarella* (→ × *Heucherella* Wehrhahn 1930 Gartenstauden I, 545) (nat. + art. hyb.) IK 1947, Knobloch 1972, Willis 1985, Soltis & Kuzoff 1995, IPNI 2011

Mitella × *Tiarella* (nat. hyb.) see Soltis & Kuzoff 1995

Tellima grandiflora × *Tolmiea menziesii* (nat. hyb. in Oregon and Washington, USA) Soltis & Bohm 1985, Doyle et al. 1985, Soltis & Kuzoff 1995, Weiblen & Brehm 1996

Saxifrageae 1: 560

rockfoil, saxifrage = Steinbrech

Saxifraga 560.

Probably **basic type Saxifragaceae tribe Saxifrageae (*Saxifraga*)** (1: 560): well-defined monogeneric tribe. The species of this large genus are connected by 86 IS.

IS: POWO (2026): *Saxifraga* 86 IS!

References:

- Doyle JJ, Soltis DE & Soltis PS (1985) An intergeneric hybrid in the Saxifragaceae: evidence from ribosomal RNA genes. *Amer. J. Bot.* 72, 1388–1391. *Tellima* × *Tolmiea*.
- Folk et al. (2023) Identifying Climatic Drivers of Hybridization with a New Ancestral Niche Reconstruction Method. *Syst. Bot.* <https://doi.org/10.1093/sysbio/syad018> **Heuchereae**
- Rieseberg LH & Soltis DE (1987) Allozymic differentiation between *Tolmiea menziesii* and *Tellima grandiflora* Saxifragaceae. *Systematic Botany* 12, 154–161.
- Soltis DE & Bohm DE (1985) Chromosomal and flavonoid chemical confirmation of intergeneric hybridization between *Tolmiea* and *Tellima* (Saxifragaceae). *Canad. J. Bot.* 63, 1309–1312.
- Soltis DE & Kuzoff RK (1995) Discordance between nuclear and chloroplast phylogenies in the *Heuchera* group (Saxifragaceae). *Evolution* 49, 727–742.
- Soltis DE & Soltis PS (1986) Intergeneric hybridization between *Conimitella williamsii* and *Mitella stauropetala* (Saxifragaceae). *Systematic Botany* 11, 293–297.
- Weiblen GD & Brehm BG (1996) Reproductive strategies and barriers to hybridization between *Tellima grandiflora* and *Tolmiea menziesii* (Saxifragaceae). *Amer. J. Bot.* 83, 910–918. <http://geo.cbs.umn.edu/Weiblen&Brehm1996.pdf>

Scrophulariaceae s.str. (Lamiales) 59: 2245

figwort family = Braunwurzgewächse

Monophyletic.

Many of the former genera are now placed in Plantaginaceae.

10 tribes, e.g. Buddlejeae 1: 108, Scrophularieae 6: 940, Verbasceae 6: 940, ...

Buddlejeae 1: 108

Buddleja 108.

Probably **basic type Scrophulariaceae tribe Buddlejeae (*Buddleja*)** (1: 108). The species of this monogeneric tribe are closely related and linked by 13 interspecific hybrids.

IS: POWO (2026): *Buddleja* 11 IS.

Scrophulariaceae 9: 1000

Verbascum 200–700 (sometimes separated as own tribe), *Verbascum* 360, ...

Celsia^o (= *Verbascum* p.p.) *div. spec.* × *Verbascum div. spec.* **IS** (→ × *Celsioverbascum* K. H. Rechinger & Hub.-Mor. 1960 in Mitt. Thüring. Bot. Ges. 2 (1), 55; 1965 in Bauhinia 2, 304) **IS** IK 1966, IK 1970, Knobloch 1972, Czerepanov 1995 (*Verbascum* × *gabrielianae* nat. hyb. Caucasus), IPNI 2011

Scrophularia × *Verbascum* **IT** *Scrophulariaceae* × *Verbasceae* (→ × *Scrophulariverbascum*. P. Fourn., nat. hyb. France, *S. sp.* × *V. blattaria* → *Scrophulariverbascum dinyanum* P. Fourn.) unconfirmed, questionable Knobloch 1972, Willis 1985, POWO 2026 (accepted)

References:

Czerepanov SK (1995) Vascular plants of Russia and adjacent states (the former USSR). Cambridge: Cambridge University Press.

Solanaceae (Solanales) 102: 2300. (6 IG)

nightshade or potato family = Nachtschattengewächse

8 subfamilies (AP website 2026: „treatment needs work“):

Cestroideae 10: 210, Nicotianoideae 9: 128, Petunioideae 13: 140, Solanoideae 50 (14 tribes) 1: 1238,

...

In **Solanaceae**, a major problem for basic studies often is – similar to **Brassicaceae** – the question to what extent hybrids which have been achieved by cell fusion are symmetric!

Nicotianoideae 9: 128. **3 IG**

2 tribes: Anthocercideae 7: 31, Nicotianeae 1: 95.

IS: POWO (2026): *Nicotiana 0 IS*.

Cyphanthera × *Duboisia* *Anthocercideae* (→ *Anthocercis* × *tenuipes* and some *Cyphanthera* species are thought to be of hybridogeneous origin of these genera) El Imam et al. 1992 (*C. albicans* × *D. myoporoides*), Flora of Australia 1982 (*C. scabrella* × *D. myoporoides*)

Cyphanthera myosotidea × *Grammosolen dixonii* *Anthocercideae* El Imam et al. 1992

Duboisia hopwoodii × *Grammosolen dixonii* *Anthocercideae* El Imam et al. 1992

Duboisia × *Nicotiana* **IT** *Anthocercideae* × *Nicotianeae* Endo et al. 1987 **SO** symmetric?

Nicotiana × *Lycium* **ISF** *Nicotianoideae* × *Solanoideae* *Lycieae* Liu et al. 1995 **SO** (protoplast electrofusion) asymmetric

Nicotiana × *Petunia violacea* **ISF** *Nicotianoideae* × *Petunioideae* *Fabianeae* (→ × *Nicotunia* L. Burbank 1914 in J. Whitson et al. (eds.) Luther Burbank, Methods & Discover. & their Practic. Applic., 1: 240) IK, Knobloch 1972, Kim et al. 1987 (**SO** symmetric?), Bonnett & Glimelius 1990 (asymmetric), Hinnisdaels et al. 191 (SO, highly asymmetric!) IPNI 2008, POWO 2026, https://www.reddit.com/r/plantbreeding/comments/1m602no/petunia_hybrida_x_nicotiana_alata_x_nicotunia/ 2025 (art. hyb. *N. alata* × *P. hybrida*, hand-pollinated, sterile, not scientifically confirmed, but interesting)

Nicotiana × *Scopolia* **ISF** *Nicotianoideae* × *Solanoideae* *Hyocyameae* asymmetric? Zubko et al. 1992 **SO**

Nicotiana tabacum × *Solanum melongena* **ISF** *Nicotianoideae* × *Solanoideae* *Solaneae* Toki et al. 1990 **SO** symmetric?

Petunioideae 13: 140. **1 IG**

2 tribes: Fabianeae 3: 63, Brunfelsieae 6: 77.

Calibrachoa (= *Petunia* p.p.) × *Petunia* Fabianeae (→ × *Petchoa* Boker & J. M. H. Shaw 2007 Hanburyana 2, 50) IPNI 2008, POWO2026, <http://www.freepatentsonline.com/PP18824.html>. but see Watanabe et al. 2001 (no success): <http://rms1.agsearch.agropedia.affrc.go.jp/contents/JASI/pdf/society/62-1408.pdf>

Solanoideae 62: 2000. 2 IG

12 tribes, e.g. Capsiceae 2: 243, Datureae 3: 20, Hyoscyameae 7: 55, Lycieae 1: 101, Mandragoreae 1: 4, Nicandreae 1: 3, Physalideae 29: 300, Solaneae 1: 1240, ...

Solaneae 1: 1240

nightshade or potato tribe = Kartoffeln

Solanum 1240.

Probably basic type Solanaceae Solanoideae tribe Solaneae (*Solanum*) (1: 1240). Famous genus with unique characteristics and a large variety of species, connected by 4 interspecific hybrids.

IS: POWO (2026): *Solanum* 4 IS (but there exist more).

See also Wise (2005).

Acnistus° (“*Iochroma*”) × *Iochroma* Physaleae [(*Acnistus arborescens* × *Iochroma grandiflora*)] × *Iochroma coccinea*] http://www.socalhort.org/green-sheets/SCHS_GreenSheet_1999_12.pdf („David Verity showed this unusual complex intergeneric hybrid of his own creation. The plant and its flowers looked much like an *Iochroma*. David said that it should become a large shrub. The tubular, nodding, rosy-violet flowers are produced in clusters.”) Not mentioned by IPNI; *Iochroma* is an ornamental shrub.

Atropa bella-donna × *Datura innoxia* IT Hyoscyameae × Datureae Krumbiegel-Schroeren 1980 SO
Atropa + *Duboisia* ISF SO coculture Solanoideae Hyoscyameae + Nicotianoideae Mahagamasekera et al. 1998

Atropa × *Hyoscyamus* Hyoscyameae Giri & Ahuja 1995 (SO, asymmetric ?)

Atropa belladonna × *Nicotiana chinensis* ISF Hyoscyameae × Nicotianoideae Gleba et al. 1982 (SO asymmetric!), Kushnir et al. 1991 (SO)

Brugmansia × *Datura* Datureae unconfirmed <https://mycotopia.net/forums/botanicals/58720-vine-datura-help.html> „*Datura* will always come in a bush shape there are no known vine varieties. *Datura* come on several flower colours; red, shades of purple and variations on white. There are successful intergeneric hybrids that are sterile that have been a cross with *Brugmansia*. Leaf shape in *Datura* is not always serrated either, be careful some are slightly heart shaped and are smooth as in *D. metel*. Note the smooth seed pods in the picture.“

Capsicum annuum × *Lycopersicon esculentum* IT Capsiceae × Solaneae Wojciechowski-Andrzewski 1986, Belea 1992. no hybrids, only pollen tube growth was tested

Capsicum × *Solanum* IT Capsiceae × Solaneae Lange 1949: no hybrids, Willis 1985

Cyphomandra° (*Solanum* p.p.) × *Lycopersicon*° (*Solanum* p.p.) IS Solaneae Kryzanovskii 1954, see also Spooner et al. 1993

Datura × *Physalis* IT Datureae × Physaleae asymmetric Gupta et al. 1984 (SO AS)

Hyoscyamus × *Nicotiana* ISF Hyoscyameae × Nicotianoideae SO symmetric? Zubko et al. 1992

Lycopersicon° (= *Solanum* p.p.) × *Nicotiana rustica* ISF Solaneae × Nicotianoideae Knobloch 1972 SO → asymmetric according to Krumbiegel-Schroeren et al. 1994

Lycopersicon° (*Solanum* p.p.) × *Solanum* IS Solaneae Knobloch 1972, Willis 1985, Surikov & Vorobeveva 1987 EC (*L. esculentum* × *S. lycopersicoides*), Sakamoto & Taguchi 1991 SO symmetric, Budin & Gavrilenko 1994, Wolters et al. 1994 SO symmetric, Sherraf et al. 1994 SO symmetric

References:

- Ahuja PS et al. (1993) Regeneration of intergeneric somatic hybrid plants between *Atropa belladonna* L. and *Hyoscyamus muticus* L. Plant Science (Limerick) 92 (1), 91–98.
- Bonnett HT & Glimelius K (1990) Cybrids of *Nicotiana tabacum* and *Petunia hybrida* have an intergeneric mixture of chloroplasts from *Petunia*-hybrid and mitochondria identical or similar to *Nicotiana tabacum*. Theoretical & Applied Genetics 79, 550–555.
- Budin KZ & Gavrilenko TA (1994) Genetic bases of remote hybridization in potato. Genetika 30, 1413–1422.
- Chapman JV (1986) Intergeneric somatic hybridisation studies in the Solanaceae. University of Nottingham. Thesis (Ph. D.)
- El Imam YMA et al. (1991/1992) Secondary metabolites of intergeneric hybrids of the Anthocercideae (family Solanaceae). Int. J. Pharmacognosy 29, 263–267.
- Endo T et al. (1987) An intergeneric hybrid cell line of *Duboisia hopwoodii* and *Nicotiana tabacum* by protoplast fusion. J. Plant Physiol. 129, 453–460. **IT, symmetric?**
- Giri CC & Ahuja PS (1995) Characterizing intergeneric regenerants of protoplast: fusion between *Hyoscyamus muticus* (Egyptian henbane) and *Atropa belladonna* (Indian sagangur). Current Science 69, 458–461.
- Gleba YY et al. (1988) Intergeneric asymmetric hybrids between *Nicotiana plumbaginifolia* and *Atropa belladonna* obtained by Gamma-fusion. Theoretical & Applied Genetics 76, 760–766.
- Gleba YY et al. (1982) Intertribal hybrid cell lines of *Atropa belladonna* × *Nicotiana chinensis* obtained by cloning individual protoplast fusion products. Theoretical & Applied Genetics 62, 75–79. **SO, IT, symmetric.**
- Gleba YY et al. (1983) Genetic processes in intergeneric cell hybrids *Atropa belladonna* + *Nicotiana chinensis* 1. genetic Constitution of cells of different clonal origin grown in-vitro. Theoretical & Applied Genetics 65 (4), 269–276. **SO, symmetric?**
- Gleba YY et al. (1987) Spatial separation of parenteral genomes in hybrids of somatic plant cells. Proc. National Acad. Sci. USA 84 (11), 3709–3713. *Atropa* × *Nicotiana* **SO, symmetric?**
- Gupta PP et al. (1984) Intergeneric nuclear gene transfer between somatically and sexually incompatible plants through asymmetric protoplast fusion. Molecular & General Genetics 197 (1), 30–35. *Datura* × *Physalis* **SO, AS**
- Hinnisdaels S et al. (1991) Highly asymmetric intergeneric nuclear hybrids between *Nicotiana* and *Petunia*. Evidence for recombinogenic and translocation events in somatic hybrid plants after Gamma-fusion. Theoretical & Applied Genetics 82 (5), 609–614. **Asymmetric SO**
- Kim JC et al. (1987) Intergeneric somatic hybrids by electrofusion of protoplasts between *Nicotiana tabacum* and *Petunia inflata*. [Korean] Korean J. Botany 30, 1–10. **symmetric?**
- Krumbiegel-Schroeren G (1980) Versuche zur sexuellen und somatischen Hybridisierung von *Atropa belladonna* L. und *Datura innoxia* Mill. Universität Köln: Dissertation (Ph. D. thesis).
- Krumbiegel-Schroeren G et al. (1994) Somatic hybridization as a tool for tomato breeding. Euphytica 79, 265–277.
- Kryzanovskii F (1954) A hybrid between *Cyphomandra* and tomato. Vestn. Akad. Nauk SSSR (Rec. Acad. Sci. USSR).
- Kushnir S et al. (1991) Nucleo-cytoplasmic incompatibility in cybrid plants possessing an *Atropa* genome and a *Nicotiana* plastome. Mol. Gen. Genet. 225, 225–230.
- Lange AH (1949) Intergeneric and interspecific cross-pollination studies of *Capsicum*, *Lycopersicum*, *Physalis* and *Solanum*. Thesis. Oregon State College.
http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/8963/Lange_Arthur_H_1949.pdf?sequence=1
- Liu B et al. (1995) Intergeneric somatic hybrid plants of *Nicotiana tabacum* L. and *Lycium barbarum* L. by protoplast electrofusion. Acta Botanica Sinica 37 (4), 259+.
- Olmstead RG et al. (2008) A molecular phylogeny of the Solanaceae. Taxon 57 (4), 1159–1181.
- Sakamoto K & Taguchi T (1991) Regeneration of intergeneric somatic hybrid plants between *Lycopersicon esculentum* and *Solanum muricatum*. Theoretical & Applied Genetics 81, 509–513.
- Sherraf I et al. (1994) Production and characterization of intergeneric somatic hybrids through

- protoplast electrofusion between potato (*Solanum tuberosum*) and *Lycopersicon pennellii*. Plant Cell Tissue & Organ Culture 37, 137–144.
- Spooner DM et al. (1993) Chloroplast DNA evidence for the interrelationships of tomatoes, potatoes, and pepinos (Solanaceae). Amer. J. Bot. 80 (6), 676–688.
- Surikov IM & Vorobeva GA (1987) Obtaining the intergeneric hybrids *Lycopersicon esculentum* × *Solanum lycopersicoides*. [Russian]. Doklady Vsesoyuznoi Ordena Lenina i Ordena Trudovogo Krasnogo Znameni Akademii Sel'Skokhozyaistvennykh Nauk Imeni V i Lenina (1), 11–13.
- Toki S, Kameya T & Abe T (1990) Production of a triple mutant chlorophyll-deficient Streptomycin and Kanamycin resistant *Nicotiana tabacum* and its use in intergeneric somatic hybrid formation with *Solanum melongena*. Theoretical & Applied Genetics 80, 588–592.
- Wise KP (2005) Interspecific hybrids in the Solanaceae. Occasional Papers of the BSG 5, 17–18.
- Wojciechowski A & Andrzejewski RP (1986) Evaluation of crossability in intergeneric crosses *Lycopersicon esculentum* Mill. × *Capsicum annuum* L. based on the pollen tube growth. Bull. Polish Academy of Sciences Biology 34, 219–226.
- Wolters AM (1994) Analysis of nuclear and organellar DNA in somatic hybrids between solanaceous species. Ph. D. thesis Wageningen.
- Wolters AM et al. (1994) Somatic hybridization as a tool for tomato breeding. Euphytica 79, 265–277.
- Zubko MK et al. (1992) New type of cytoplasmic male sterility in *Nicotiana* times *Hyoscyamus* and *Nicotiana* times *Scopolia* hybrids reconstructed by cytoplasm. Doklady Akademii Nauk 325 (5), 1062–1066.

Theaceae (Ericales) 8-9: 200–460. 4 IG (incl. 1 IT)

tea family = Teestrauchgewächse

Only the genera of the former subfamily Theoideae are left in Theaceae. The remaining genera are now placed in other families.

3 tribes:

Gordonieae 3: 40 *Franklinia* 1, *Gordonia* 22, *Schima* 17.

Stewartieae 1: 9 *Stewartia* 9–20.

Theaeae 5: 230–420 *Apterosperma* 1 (hybridogenuous), *Camellia* (= *Thea*°) 120–280, *Laplacea* 8, *Polyspora* 32, *Pyrenaria* (incl. *Tutcheria*°) 42–60.

Probably **basic type family Theaceae** (9: 200–460). Most genera and 2 of the 3 tribes are linked by hybridization, see the figure below. No hybrids are known connecting the small monotypic basal tribe Stewartieae (1: 9).

IS: POWO (2026): *Camellia* 1 IS.

Camellia japonica, *sasanqua* × *Franklinia alatomahua* **IT** *Theaeae* × *Gordonieae* Ackerman & Williams 1982

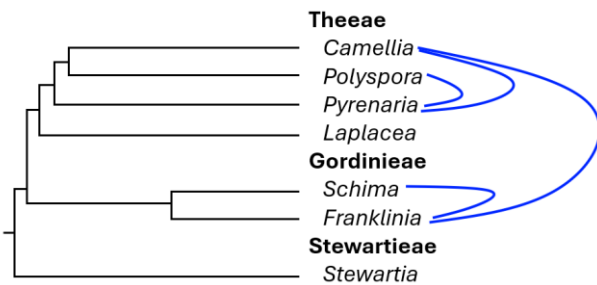
Camellia div. spec. × *Tutcheria*° (= *Pyrenaria* p.p.) div. spec. *Theaeae* Asper 1961, Ackerman 1970

Franklinia × *Gordonia* *Gordonieae* (→ × *Gordlinia* 2006 HortScience 41 (6), 1387).

<http://forums2.gardenweb.com/forums/load/trees/msg061415559081.html>, Ranney & Fantz 2006, IPNI 2008

Franklinia alatomahua × *Schima argentea* *Gordonieae* (→ × *Schimlinia floribunda* Ranney & Fantz 2003 HortScience 38 (6), 1200), Ranney et al. 2003, IPNI 2011

Parapyrenaria° (*Pyrenaria*) × *Polyspora* (→ *Apterosperma oblata* Hung T. Chang 1976 Acta Sci. Nat. Univ. Sunyatseni 90 (**HY**, S-E China, possibly ancient hybrid, see AP website 2026), POWO 2026



Theaceae: hybrid connections in the nuclear genes phylogeny according to Yan Y et al. (2024).
<https://doi.org/10.1016/j.ympev.2024.108089>

References:

- Ackerman WL (1970) Intergeneric hybrids of *Camellia* with related genera. Amer. Camellia Yearbook 23, 100–105.
http://americancamellias.aawsom.net/assets/pdf/yearbook_1970_23_intergeneric_hybrids_of_camellia_with_related_genera.pdf.
- Ackerman WL & Williams M (1982) Intergeneric crosses within Theaceae and the successful hybridization of *Camellia japonica* and *Camellia sasanqua* with *Franklinia alatamaha*. HortScience 17, 566–569.
- Asper JH (1961) Notes on camellia hybridizing. Amer. Camellia Yearbook 1961, 63–73.
- Ranney TG et al. (2003) × *Schimlinia floribunda* (Theaceae): A new intergeneric hybrid between *Franklinia alatamaha* and *Schima argentea*. HortScience 38, 1198–1200.
- Ranney TG & Fantz PR (2006) × *Gordlinia grandiflora* (Theaceae): An intergeneric hybrid between *Franklinia alatamaha* and *Gordonia lasianthus*. HortScience 41 (6), 1386–1388.
- Yan Y et al. (2024) A new nuclear phylogeny of the tea family (Theaceae) unravels rapid radiations in genus *Camellia*. Molecular Phylogenetics and Evolution. 196.
<https://doi.org/10.1016/j.ympev.2024.108089>

Verbenaceae (Lamiales) 32: 775. 1 IG

verbena or verbain family = Eisenkrautgewächse

Many genera which have formerly been assigned to the family have been moved to other families.
 8 tribes.

Investigations of Sanders (2016) with the method of baraminological distance correlations support the holobaraminic status of **Verbenaceae** (32: 775).

Glandularia × *Verbena* **HY** **Verbeneae** Yuan & Olmstead 2008 (hybridogeneous origin of *Verbena* p.p. by intergeneric chloroplast transfers)

Reference:

- Sanders RW (2016) Evidence for holobaraminic status of the Verbenaceae (Verbena family). Journal of Creation Theology and Science Series B: Life Sciences 6, :81–90.
- Yuan Y & Olmstead RG (2008) A species-level phylogenetic study of the *Verbena* complex (Verbenaceae) indicates two independent intergeneric chloroplast transfers. Molecular Phylogenetics and Evolution 48, 23–33.

Viburnaceae (= Adoxaceae) (Dipsacales) 5: 200

viburnum family = Schneeballgewächse

2 tribes.

Adoxeae 4: 27

Adoxa 1, *Sinadoxa* 1, *Tetradoxa* 1, *Sambucus* 24.

IS: POWO (2026): *Sambucus* 2 IS (*cerulea* × *nigra* art. hyb.; *nigra* × *racemosa* nat. hyb.).

Viburneae 1: 175

Viburnum 175.

Probably **basic type Viburnaceae tribe Viburneae** (*Viburnum*) (1: 175). Well-defined monogeneric tribe. The species are linked by 12 IS.

IS: POWO (2026): *Viburnum* 12 IS.

Violaceae (Malpighiales) 26: 1126

violet family = Veilchengewächse

2 subfamilies: Fusispermoideae 1: 3, Violoideae 25: 795.

Violoideae 25: 1120

2 clades: Briberieae 1: 3, the rest: 25: 1150.

Hybanthus 120, *Melicytus* 19, *Rinorea* 250, *Viola* 600, ...

In **Violaceae** probably all 600–700 species of genus *Viola* belong to the same basic type. They are connected by the very high number of 270 interspecific hybrids.

IS: POWO (2026): *Hybanthus* 0 IS, *Melicytus* 1 IS, *Rinorea* 1 IS, *Viola* 166 IS! (but definitely much more hybrids are known in *Viola*).

Hymenanthera^o (= *Melicytus* p.p.) × *Melicytus* **IS** Beuzenberg 1961

References:

Beuzenberg EJ (1961) Observations on sex differentiation and cyto-taxonomy of the New Zealand species of Hymenanthérinae (Violaceae). New Zealand J. Sci. 4 (2), 337–349.

Marcussen T et al. (2022) A revised phylogenetic classification for *Viola* (Violaceae). Plants (Basel). doi: 10.3390/plants11172224.

Vitaceae (Vitales) 17: 1000. (2 IT)

grape family = Weinrebengewächse

Sole family of the order Vitales.

2 subfamilies: Leeoideae 1: 34 (*Leea*), Vitoideae 16: 940.

Vitoideae 16: 940. **2 IT**

5 tribes:

Ampelopsidae 4: 47 *Ampelopsis* 18, ...

Cayratieae 7: 405 *Tetrastigma* 100, ...

Cissieae 1: 300 *Cissus* 300.

Parthenocisseae 2: 16 *Parthenocissus* 14,

Viteae 2: 190 *Ampelocissus* 115, *Vitis* 75 (incl. *Muscadinia*^o).

Possibly **Vitaceae subfamily Vitoideae** (16: 940) represents a basic type because 3 of the 5 tribes are connected by hybridization.

IS: POWO (2026): *Vitis* 15 IS, see also https://en.wikipedia.org/wiki/Hybrid_grape e.g. *Vitis labrusca* × *Vitis riparia* → *Vitis* × *novae-angliae*.

Ampelopsis × *Vitis vinifera* **IT** Ampelopsideae × Viteae after tetraploidization Volynkin et al. 2021 **EC**

Muscadinia^o (= *Vitis*) *rotundifolia* × *Vitis vinifera* **IS** Viteae Chaparro et al. 1989

Parthenocissus × *Vitis vinifera* **IT** Parthenocisseae × Viteae

<https://doi.org/10.17660/ActaHortic.2021.1324.27> after tetraploidization Volynkin et al. 2021 **EC**

References:

Chaparro JX et al. (1989) Identification of *Vitis vinifera* L. × *Muscadinia rotundifolia* small hybrids by starch gel electrophoresis. HortScience 24, 128–130.

Volynkin V et al. (2021) Experimental variability of grapes in Vitaceae family based on the use of allotetraploidy and in vitro embryo culture. <https://doi.org/10.17660/ActaHortic.2021.1324.27>

Zingiberaceae (Zingiberales) 58: 1100–1960. (1 IG)

ginger family = Ingwergewächse

4 subfamilies.

IS: POWO (2026) *Alpinia* 2 **IS**, *Globba* 2 **IS**, *Hedychium* 4 **IS**, *Roscoea* 1 **IS**.

Alpinioideae 20: 1000

2 tribes.

Alpinieae 16: 830. 1 IG

Alpinia 200, *Etlingera* 110, *Renealmia* 75, ...

Alpinia purpurata × *Etlingera elatior* (→ × *Alpingera* F. Luc-Cayol) Luc-Cayol & Fereol 1997 (art. hyb.) IPNI 2005, AP website 2025, POWO 2026

References:

Luc-Cayol F & Fereol L (1997) × *Alpingera martinica* (Zingiberaceae): An intergeneric hybrid between *Alpinia purpurata* and *Etlingera elatior*. HortScience 32 (5), 914–915.

Zosteraceae (Alismatales) 4: 29

eel grass family = Seegrasgewächse

One of several groups of seagrasses.

No subdivision.

Heterozostera 5 (or part of *Zostera*), *Nanozostera* 4 (or part of *Zostera*), *Phyllospadix* 5, *Zostera* 15.

Probably **basic type family Zosteraceae (3: 15)** as a distinct, monophyletic family.

IS: POWO (2026): 0 **IS**.