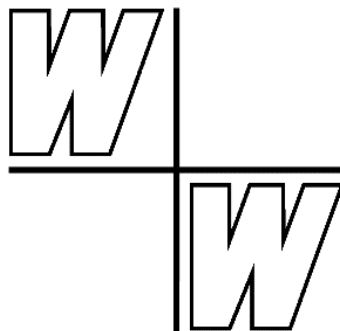


Data Collection on Intergeneric Hybrids and Basic Types: **PTERIDOPHYTA**

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<https://www.wort-und-wissen.org/artikel/data-collection-basic-types/>

"PTERIDOPHYTA"

2 classes, 14 orders, 51 families, 340 genera, 11800 species

extant ferns, horsetails and lycophytes

= rezente Farne, Schachtelhalme und Bärlappe

Now two distinct classes

Systematics according to Smith et al. 2006, updated by the Pteridophyte Phylogeny Group (PPG I) (2016) A community-derived classification for extant lycophytes and ferns. J. Syst. Evol. 54 (6) <https://onlinelibrary.wiley.com/doi/full/10.1111/jse.12229>

class Lycopodiopsida: 3 orders.

class Polypodiopsida: 4 subclasses:

Equisetidae 1 order.

Ophioglossidae 2 orders.

Marattiidae 1 order.

Polypodiidae 7 orders.

Hybridization is rather common in ferns, and has been of great importance in their evolution, see e.g. Vida (1976) and Wagner (1983).

Fern hybrids known up to 1996 have been compiled by Knobloch (1996), see also Hassler: Checklist of the Ferns and Lycophytes of the World 2025.

Summary:

29 intergeneric hybrids, in 10 families.

14 preliminary basic types, average species number (46411 / 14) = 332 species.

Basic type level: genus-tribe 1, subfamily 1, family 12.

Anemiaceae (*Anemia*) 1: 115. – (12 IS)

Aspleniaceae 2: 740. **1 IG**

Cystopteridaceae 3: 37. **1 IG**

Dryopteridaceae Dryopteridoideae tribes Dryopterideae + Polysticheae 5: 1003. **2 IG/IT**

Equisetaceae* (*Equisetum*) 1: 17. – (22 IS)

Isoetaceae* (*Isoetes*) 1: 250. – (26 IS)

Lycopodiaceae* 16: 388. **0 IG**

Ophioglossaceae* 10: 112. **0 IG**

Osmundaceae* 6: 18. **2 IG**

Polypodiaceae 11: 375. **6 IG** (incl. **1 ISF**)

Psilotaceae* 2: 17. **0 IG**

Selaginellaceae* (*Selaginella*) 1: 700. – (3 IS)

Thelypteridaceae Thelypteridoideae tribe Menischieae 27: 700. **11 IG**

Woodsiaceae 2: 40. **1 IG**

General references on Pteridophyta:

- Christenhusz M et al. (2011) A linear sequence of extant families and genera of lycophytes and ferns. *Phytotaxa*. 19, 7–54. doi:10.11646/phytotaxa.19.1.2
- Checklist of the Ferns and Lycophytes of the World → Hassler M
- Hassler M (1994–2026) World ferns. Synonymic checklist and distribution of ferns and lycophytes of the world. Version 25.09; last update Sept. 23rd, 2025. Covering 13,202 accepted species, 814 hybrids. www.worldplants.de/ferns/ Valuable information
- IPNI = International plant names index = www.ipni.org
- Knobloch IW (1996) Pteridophyte hybrids and their derivatives. Dep. of Botany and Plant Pathology, Michigan State University, East Lansing. [Very valuable list of interspecific and intergeneric hybrids with hundreds of citations till 1996, but be aware that many species have been transferred into other genera, since!](#)
- Liu H-M, Schuettpelz E & Schneider H (2020) Evaluating the status of fern and lycophyte nothotaxa in the context of the Pteridophyte Phylogeny Group classification (PPG I). *J. Syst. Evol.* <https://onlinelibrary.wiley.com/doi/10.1111/jse.12641>
- POWO = Plants of the World Online <https://powo.science.kew.org/>
- PPG I = Pteridophyte Phylogeny Group (PPG I) (2016) A community-derived classification for extant lycophytes and ferns. *J. Syst. Evol.* 54 (6) <https://onlinelibrary.wiley.com/doi/full/10.1111/jse.12229>
- Schuettpelz E & Pryer KM (2007) Fern phylogeny inferred from 400 leptosporangiate species and three plastid genes. *Taxon* 56, 1037–1050. <http://www.pryerlab.net/publication/fichier1085.pdf>
- Smith AR, Pryer KM, Schuettpelz P, Korall H, Schneider H & Wolf G (2006) A classification for extant ferns. *Taxon* 55, 705–731. <http://www.pryerlab.net/publication/fichier749.pdf>
- Vida G (1976) The role of polyploidy in evolution. *Evol. Biol. (Praha)* 9, 267–294.
- Wagner WH (1983) Reticulistics: the recognition of hybrids and their role in cladistics and classification. In Platnick NI & Funk VA (eds.): *Advances in Cladistics* 2, 63–79. New York: Columbia University Press.

Abbreviations:

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

* = only family of an order

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).

Gray letters: hybridity unconfirmed or erroneous.

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

Yellow shaded: Notes concerning basic types.

Class

LYCOPODIOPSIDA

3 orders, 3 families, 18 genera, 1338 species
lycophytes = Bärlappe

Lycopodiales 1 family

Lycopodiales: Lycopodiaceae 16: 388 + 1 extinct genus

clubmosses = Bärlappgewächse

Formerly, *Huperzia*, *Lycopodiella* etc. were sometimes included in *Lycopodium*.

PPG I (2016): monophyletic, 3 subfamilies:

Lycopodielloideae 4: 54 *Lycopodiella*, *Pseudolycopodiella*, ...

Lycopodioidae 9: 58 *Austrolycopodium* 2, *Diphasiastrum* 6, *Diphasium* 4.

Lycopodiastrum 1 (separated by Chen et al. 2021 in an own subfamily), *Lycopodium* 5,

...

Huperzioideae 3: 276 *Huperzia* 25, *Phlegmariurus* 250, *Phylloglossum* 1.

Possibly **basic type family Lycopodiaceae** (16: 388) as a well-defined monophyletic and isolated taxon, though intergeneric hybrids are unknown, so far.

IS: POWO (2026): *Diphasiastrum* 7 IS, *Huperzia* 9 IS, *Lycopodiella* 5 IS, *Lycopodium* 5 IS.

(Fossil order **Rhizomorphales** = Bärlappbäume)

Junker R (1999) Konvergenzen und komplexe Stammform. Zur Phylognese der Bärlappbäume. Stud. Integrale J. 6, 13–18.

Junker R (2000) Samenfarne. Bärlappbäume. Schachtelhalme. Pflanzenfossilien des Karbons in evolutionstheoretischer Perspektive, Studium Integrale. Holzgerlingen: Hänsler.

Isoetales 1 extant family + 3 extinct families

Isoetales: Isoetaceae 1: 250 + 4 extinct genera

quillworts = Brachsenkräuter

PPG I: monophyletic.

Isoetes 250.

IS: POWO (2024): *Isoetes* 27 IS.

Isoetes is a “living fossil” at least since the Triassic (Retallack 1997; 2013, <https://doi.org/10.1016/j.gr.2012.03.003>).

Probably **basic type family Isoetaceae** (*Isoetes*) (1: 250) as for the extant taxa: A well-defined monogeneric and monophyletic family with 26 interspecific hybrids.

IS: POWO (2026): *Isoetes* 26 IS.

Selaginellales 1 family + few extinct species

Selaginellales: Selaginellaceae 1: 700

spike mosses, lesser clubmosses = Moosfarne

Selaginella 700.

Probably **basic type family Selaginellaceae** (1: 700). A well-defined monogeneric family, though nearly no hybrids are known.

IS: POWO (2025): 2 IS. Knobloch (1996): 4 IS.

References:

- Retallack GJ (1997) Earliest Triassic origin of *Isoetes* and quillwort evolutionary radiation. *Journal of Paleontology* 71, 500–521. doi:10.1017/S0022336000039524
- Retallack GJ (2013) Permian and Triassic greenhouse crises. *Gondwana Research* 24, 90–103. <https://doi.org/10.1016/j.gr.2012.03.003>

Class

POLYPODIOPSIDA = FILICOPSIDA

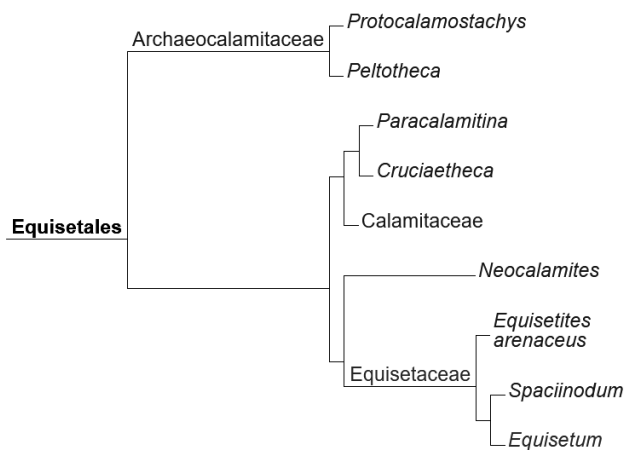
4 subclasses, 11 orders, 48 families, 319 genera, 10.578 species

Subclass EQUISETIDAE

1 extant order, 1 family, 1 genus, 15 species

horsetails = Schachtelhalme

Equisetales 1 extant family + several fossil families



Order Equisetales (incl. extinct taxa): phylogeny of Elgorriaga et al. (2018) doi:10.1002/ajb2.1125, from en.wikipedia (2025, CC-BY-SA 4.0).

Equisetales: Equisetaceae 1: 18 + some extinct taxa

horsetail family = Schachtelhalmgewächse

PPG I 2016: Monophyletic. *Equisetum* is an isolated genus of closely related and recently divergent species.

Equisetum 2–3 subgenera: *Hippochaete* 9, *Equisetum* 8, *Paramochaete* 1 (since 2019 excluded from subgenus *Equisetum*).

Probably **basic type family Equisetaceae** (1: 18). Well-defined monogeneric family with closely related species. Hybrids are common, but hybridization has only been recorded within the subgenera, which have been separated for a long time. The hybrid *Equisetum scirpoides* × *E. variegatum* for example has a divergence time between 75 and 91 mya; and *E. pratense* × *E. fluviatile* has a divergence time between 90 and 99 mya (cf. Christenhuiz et al. 2021, fig. 2; Marcussen 2025; Lubienski & Dörken 2016; Lubienski (2010, tab. 2). – It is unknown if fossil horsetails (e.g. fossil

Equisetum since Carboniferous, see Christenhusz et al. 2021) and *Calamites* species belong to the same basic type, see Junker R (2000, p. 132).

IS: POWO (2024): *Equisetum* 22 IS. (see also Lubienski & Dörken 2016 and Lubienski 2010).

en.wikipedia 2024: 14 IS, 9 in subgenus *Equisetum* and 5 in subgenus *Hippochaete*.

12 hybrids between species in subgenus *Equisetum*:

arvense × *fluviatile*, *palustre*, *pratense*, *sylvaticum*, *telmateia*

fluviatile × *palustre*, *pratense*, *telmateia*

palustre × *pratense*, *telmateia*

pratense × *sylvaticum*

sylvaticum × *telmateia*

10 hybrids between species in subgenus *Hippochaete*:

giganteum × *myriochaetum*

hyemale × *laevigatum*, *ramosissimum*, *trachyodon*, *variegatum*

laevigatum × *variegatum*

myriochaetum × *praealtum*

praealtum × *variegatum*

ramosissimum × *variegatum*

scirpoides × *variegatum*

References:

- Christenhusz MJM et al. (2021) Biogeography and genome size evolution of the oldest extant vascular plant genus, *Equisetum* (Equisetaceae). *Ann. Bot.* 17; 127(5), 681–695. doi: 10.1093/aob/mcab005 e.g. *Equisetum* subgenus *Paramochaete*
- Guillon J-M (2004) Phylogeny of horsetails (*Equisetum*) based on the chloroplast *rps4* gene and adjacent noncoding sequences. *Syst. Bot.* 29 (2), 251–259.
- Junker R (2000) Samenfarne. Bärlappbäume. Schachtelhalme. Pflanzenfossilien des Karbons in evolutionstheoretischer Perspektive, Studium Integrale. Holzgerlingen: Hänsler.
- Lubienski M (2010) A new hybrid horsetail *Equisetum* × *lofotense* (*E. arvense* × *E. sylvaticum*, Equisetaceae) from Norway. *Nordic Journal of Botany* 28 (5), 530– 540, <https://nsojournals.onlinelibrary.wiley.com/doi/epdf/10.1111/j.1756-1051.2010.00806.x>
- Lubienski M & Dörken VM (2016) The hybrid between *Equisetum scirpoides* and *E. variegatum* in Northern Europe. *American Fern Journal* 106 (2), 116–130.
- Marcussen T (2025) Blogspot on *Equisetum*: <https://blog.annelida.de/2025/12/05/door-5-horsetail-equisetum-species-still-hybridise-100-million-years-after-they-diverged/>

Subclass OPHIOGLOSSIDAE
2 orders, 2 families, 12 genera, 129 species

Ophioglossales 1 family

Ophioglossales: Ophioglossaceae 10: 112

adder's-tongue family = *Natternzungengewächse*

4 subfamilies:

Botrychioideae 4: 53 *Botrychium* 35, *Sceptridium* 25, ...

Helminthioideae 1: 1.

Mankyuoideae 1: 1.

Ophioglossoideae 4: 47 *Cheiroglossa* 2, *Ophioglossum* 41, ...

Possibly **basic type family Ophioglossaceae** (10: 112) as an isolated taxon and sole family of the order Ophioglossales, though intergeneric hybrids are unknown.

IS: POWO (2025): *Botrychium* 2 IS, *Ophioglossum* 3 IS, *Sceptridium* (sub *Botrychium*) 4 IS.

Psilotales 1 family

Psilotales: Psilotaceae 2: 17

fork ferns, whisk ferns = *Gabelblattgewächse*

Psilotum 2, *Tmesipteris* 15.

Possibly **basic type family Psilotaceae** (2: 17) as an isolated taxon and sole family of the order Psilotales, though intergeneric hybrids are unknown.

IS: POWO (2025): *Psilotum* 1 IS, *Tmesipteris* 0 IS.

Subclass MARATTIIDAE

1 order, 1 family, 6 genera, 111 species

Marattiales 1 family

Marattiales: Marattiaceae 6: 111 + many extinct taxa

giant fern family = Marattiengewächse

Isolated family.

The earliest members of the family appeared during the Carboniferous.

Angiopteris 30 (incl. *Archangiopteris*^o etc.), *Christensenia* 2, *Danaea* 50, *Eupodium*, *Marattia* 7, *Ptisana* 20.

POWO (2025): *Angiopteris* 1 IS (× *itoi*), *Danaea* 3 IS, *Marattia* 0 IS, *Ptisana* 0 IS.

Angiopteris × *Archangiopteris*^o (= *Angiopteris* p.p.) IS (→ *Angiopteris sparsisora*) (nat. hyb.) Ching & Wang 1982, Knobloch 1996

References

Ching RC & Wang ZR (1982) *Angiopteris sparsisora*, sp. nov. a putative bigeneric hybrid. Acta Phytotax. Sin. 20, 347–350.

Subclass POLYPODIIDAE

7 orders, 44 families, 300 genera, 10.323 species

true ferns = Echte Farne

Cyatheales 8 families, 13: 713

tree ferns = Baumfarne

Cyatheales: Cibotiaceae 1: 9

POWO (2026) includes the family in Cyatheaceae.

Cibotium 9.

IS: POWO (2026) (sub Cyatheaceae): *Cibotium* 2 IS.

Cyatheales: Cyatheaceae 3: 643 + 4 extinct genera

scaly tree ferns = Baumfarne i. e. S.

Monophyletic.

POWO (2026) includes Cibotiaceae and Plagiogyriaceae.

The number of genera is a matter of debate. POWO (2026) accepts 11 genera.

PPG I (2016) reduces them to 3 genera:

Alsophila 275 (incl. *Nephelea*[°] and *Gymnosphaera*[°]), *Cyathea* 265 (incl. *Cnemidaria*[°], *Hemitelia*[°], *Hymenophyllopsis*[°], *Trichopteris*[°] = *Trichipteris*[°]), *Sphaeropteris* 103 (incl. *Fourniera*[°]).

IS: POWO (2026): *Alsophila* 4 IS (× *boytelii*, × *fagildii*, × *marcescens*, × *medinae*), *Cyathea* 11 IS (× *bernardii*, × *moralesiana*, × *smithiana*, × *stella-matutina*, ...), *Sphaeropteris* 1 IS (× *lathamii*, see below).

Checklist of the Ferns and Lycophytes of the World (2025): *Cyathea* 14 IS.

Alsophila × *Nephelea*[°] (= *Alsophila* p.p.) IS (nat. hyb.) Conant 1975, 1985, Conant & Cooper-Driver 1980, Knobloch 1996

Cnemidaria[°] (= *Cyathea* p.p.) × *Cyathea* IS (→ × *Cyathidaria* Caluff 2002 Willdenowia 32 (2), 282) IS (nat. hyb.) Conant 1975, Tryon 1976, Proctor 1985, Knobloch 1996, IPNI 2008 (5 nothospecies, now all included in *Cyathea*)

Cnemidaria[°] *obtusum* (= *Cyathea* p.p.) × *Trichopteris*[°] (= *Cyathea*) *aspera* IS (nat. hyb.) Tryon 1976, Knobloch 1996

“*Cyathea*” (*Sphaeropteris*) × *Sphaeropteris* IS (*S. brownii* × *S. princeps* → *S. lathamii*) (Holttum 1984 (nat. hyb.), Knobloch 1996 → Both parents are now considered to be part of *Sphaeropteris*)

Cyatheales: Plagiogyriaceae 1: 15

Plagiogyria 15.

POWO (2026) includes the family in Cyatheaceae.

IS: POWO (2026) (sub Cyatheaceae): *Plagiogyria* 3 IS (× *neointermedia*, × *sessilifolia*, × *°wakabe*).

References:

- Caluff MG (2002) × *Cyathidaria*, a new nothogenus in the Cyatheaceae (Pteridophyta). *Willdenowia* 32, 281–283.
- Conant DS (1975) Hybrids in American Cyatheaceae. *Rhodora* 77 (812), 441–455.
- Conant DS (1985) Allohomoploidy, a new hypothesis for speciation in homoploid, homosporous ferns. *Amer. J. Bot.* 72 (6), pt 2, abstr. 340.
- Conant DS & Cooper-Driver C (1980) Autogamous allohomoploids in *Alsophila* and *Nephelea* (Cyatheaceae): a new hypothesis for speciation in homoploid, homosporous ferns. *Amer. J. Bot.* 67, 1269–1288.
- Korall P, Conant DS, Metzgar JS, Schneider H & Pryer KM (2007) A molecular phylogeny of scaly tree ferns (Cyatheaceae). *Amer. J. Bot.* 94, 873–886.
<http://www.amjbot.org/content/94/5/873.full.pdf+html>
- Holttum RE (1984) A remarkable *Cyathea* hybrid. *Amer. Fern J.* 74, 19–21.
https://www.jstor.org/stable/1547106?seq=1#page_scan_tab_contents
- Tryon RM (1976) A revision of the genus *Cyathea*. *Contr. Gray Herb.* 206, 19–98.

Gleicheniales 3 families, 12: 175 + extinct taxa forked ferns = Gabelfarne

Dipteridaceae 2: 11 *Cheiropleuria*, *Dipteris*.

Gleicheniaceae 8: 160 *Dicranopteris*, *Diplopterygium* 25, *Gleichenia* 15, *Sticherus* 95, ...

Matoniaceae 2: 4 *Matonia*, *Phanerosorus*.

IS: POWO (2026) in Gleicheniaceae: *Dicranopteris* 1 IS, *Gleichenia* 1 IS, *Sticherus* 3 IS.

Hymenophyllales 1 family

Hymenophyllales: Hymenophyllaceae 9: 434 + extinct taxa filmy ferns and bristle ferns = Hautfarngewächse

2 subfamilies:

Trichomanoideae 8: 184, Hymenophylloideae 1: 250.

IS: POWO (2026): *Hymenophyllum* 2 IS, *Trichomanes* 2 IS.

Osmundales 1 family

Osmundales: Osmundaceae 6: 18 + many extinct genera. 2 IG **royal fern family = Königsfarngewächse**

Claytosmunda 1 (accepted by PPG, not by POWO), *Leptopteris* 6, *Osmunda* 4, *Osmundastrum* 1, *Plenasium* 4 (accepted by PPG, not by POWO), *Todea* 2.

Claytosmunda is a “living fossil” at least since middle Triassic (Bomfleur et al. 2017, 53).

Possibly **basic type family Osmundaceae** (6: 18), as for the extant taxa. Isolated group. 3 of the 6 genera are connected by hybridization, but they do not represent the whole family.

IS: POWO 2025: *Leptopteris* 1 IS, *Osmunda* 4 IS, *Todea* 1 IS.

Claytosmunda × *Osmunda* (→ × *Osmuntonia* Hong M. Liu et al. 2020), Liu et al. 2020 (*C. claytoniana* × *O. regalis*). Wan & Zhang (2022) propose the name × *Osmunimunda*.

Osmunda × *Plenasium* (→ × *Osmunasium mildei* Hong M. Liu et al. 2020) Liu et al. 2020 (*O. japonica* × *P. vachelii* → “*Osmunda bipinnata*” Hooker)

References:

Bomfleur B, Grimm GW & McLoughlin S (2017) The fossil Osmundales (Royal Ferns)—a phylogenetic network analysis, revised taxonomy, and evolutionary classification of anatomically preserved trunks and rhizomes. *PeerJ* 5, e3433.
<https://peerj.com/articles/3433/>

Wang X & Zhang L-B (2022) Three new fern names of hybrid genera and four new combinations in Athyriaceae, Osmundaceae, and Thelypteridaceae. *Phytotaxa* 575
<https://doi.org/10.11646/phytotaxa.575.1.8>

Polypodiales 6 suborders, 26 families, 253: 8714

Polypodiales: Aspleniaceae 2: 740 (suborder Aspleniinae) 1 IG **spleenworts = Streifenfarngewächse**

Smith et al. (2006) and PPG I (2016): monophyletic.

For phylogenetic studies, see Murakami et al. 1999, Schneider et al. 2004, 2005, Bellefroid et al. 2010.

POWO (2025) includes Blechnaceae, Cystopteridaceae, Thelypteridaceae, Woodsiaceae etc.

Asplenium 700 (incl. *Antigramma*°, *Camptosorus*°, *Ceterach*°, *Ceterachopsis*°, *Diellia*°, *Diplora*°, *Holodictyum*°, *Loxoscapha*°, *Phyllitis*°, *Pleurosorus*°, *Schaffneria*°, *Sinephropteris*°), *Hymenasplenium* 40.

Some authors accept a third genus *Hemidictyum* 1, which in PPG I (2016) is placed in a separate family Hemidictiaceae.

IS: POWO (2025) (sub Aspleniaceae s.str.): 4 ISG as synonyms of *Asplenium*.

Asplenium 130 IS, *Hymenasplenium* 2 IS.

Erroneously, the nothotaxon $\times$ *Asplenicystopteris* is still listed in POWO!

Checklist of the Ferns and Lycophytes of the World (2025): *Asplenium* 156 IS, *Hymenasplenium* 3 IS.

Basic type family Aspleniaceae (2: 740) (Kutzelnigg 1993, 2025). More than one hundred hybrids have been reported (see Knobloch 1996, POWO 2025) connecting all parts of the family, most of them within *Asplenium* s.str., and some 6 between subgenera which at that time were classified as genera. Later these subgenera were united to *Asplenium* s.l. with the exception of the resurrected genus *Hymenasplenium* as sister group of the rest. Hybrids have been reported with this genus, too, but they are unconfirmed.

Asplenium $\times$ *Camptosorus*[°] IS ($\rightarrow \times$ *Asplenosorus* Wherry 1937 Amer. Fern J. = *Asplenium* p.p.) Wherry 1925, Braun 1939, Wagner 1954, 1962, Morton 1956, Meyer 1969a, Mickel 1974, Bennert & Meyer 1972, Lovis 1973, Moran 1981, Reichstein 1984, Knobloch 1996 (7 nothospecies), IPNI 2011 (13 nothospecies)

Asplenium montanum $\times$ *Camptosorus*[°] *rhizophyllus* $\times$ *Phyllitis*[°] *scolopendrium*

(trisubgeneric hybrid) IS Wagner 1972, Wagner & Hagenah 1989, Knobloch 1996

Asplenium $\times$ *Ceterach*[°] IS ($\rightarrow \times$ *Asplenoceterach* D. E. Mey. 1957 Ber. Deutsch. Bot. Ges. 70, 61) Knobloch 1996 (3 nothospecies), IPNI 2011 (3 nothospecies) (notice, that $\times$ *Asplenoceterach badense* turned out to be a monstrous form of *C. officinarum*, see Rasbach & al. 1989 and Reichstein 1981; but that *A. majoricum* $\times$ *C. officinarum* and *A. cf. trichomanes* $\times$ *C. aureum* remain as nothospecies).

Asplenium $\times$ *Cystopteris* ~~IF~~ **Aspleniaceae** $\times$ **Cystopteridaceae** ($\rightarrow \times$ *Asplenicystopteris* P. Fournier 1934 Quatre Fl. France 10) IPNI 2011 (2 nothospecies, e.g. *A. trichomanes* $\times$ *C. fragilis* $\rightarrow \times$ *A. blindii*) $\rightarrow$ obviously only aberrant forms of *Cystopteris fragilis*, Knobloch 1996 notes: no type species acc. to Badre <http://www2.dijon.inra.fr/flore-france/as.htm> (link no longer available), erroneously in POWO 2025, not accepted by Liu et al. 2020, according to flora online (2026) the correct name is *Cystopteris fragilis* and according to GBIF (2026) the correct name is *Cystopteris blindii* <https://test.worldfloraonline.org/taxon/wfo-0000153891> <https://www.gbif.org/taxon/LSN5X>

Asplenium $\times$ *Hymenasplenium* see Knobloch et al. 1996 (*A. ceterach* $\times$ *H. cheilosorum* Bir 1963; *A. tripteropus* $\times$ *H. unilaterale* Bir 1960, Mehra 1961). These reports are unconfirmed

Asplenium $\times$ *Phyllitis*[°] (= *Asplenium* p.p.) IS ($\rightarrow \times$ *Asplenophyllitis* Alston 1940 Proc. Linn. Soc. London 152: 139 = *Asplenium* p.p.) (nat. hyb. + art. hyb.) Alston 1940, Vida 1963, 1970, Emmott 1963, 1964, Girard & Lovis 1968, Meyer 1969b, Lovis & Vida 1969, Knobloch 1996 (7 nothospecies), IPNI 2011 (7 nothospecies)

Asplenium $\times$ *Pleurosorus*[°] IS (nat. hyb. Meyer 1963 (*A. glandulosum* = *trichomanes* $\times$ *P. pozoii*), Vida 1965, Lovis 1973, Reichstein 1981, Knobloch 1996 (*A. petrarchae* $\times$ *P. hispanicus*))

Camptosorus° *rhizophyllus* × *Phyllitis*° *scolopendrium* IS (nat. hyb.) Wagner 1963, Knobloch 1996
Ceterach° (= *Asplenium* p.p.) × *Phyllitis*° IS (→ × *Ceterophyllitis* Pic. Serm. 1979; = „*Phyllitopsis hybrida*“ Reichstein) (nat. hyb.) Milde 1864, Alston 1940, Vida 1976 (*Asplenium javorkeanum* = *C. officinarum* p.p. × *P. sagittata*), Pichi-Sermolli 1979, Knobloch 1996

References:

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Polypodiales: Athyriaceae 3: 650. 1 IG (suborder Aspleniinae) **lady fern family = Frauenfarngewächse**

Athyrium 230 (incl. *Cornopteris*°), *Deparia* 70 (incl. *Triblemma*°), *Diplazium* 350, *Pseudathyrium* 1 (= *Athyrium distentifolium*, in PPG I 2016 still included in *Athyrium*).

In **Athyriaceae** probably at least the members of the 3 genera *Athyrium* + *Pseudathyrium* 231, *Deparia* 70, and *Diplazium* 350) belong to the same basic type, each, due to the high number of interspecific hybrids. The family is monophyletic. Attempts to divide it into subgroups are controversial. Thus, possibly the whole family might represent a basic type.

IS: POW0 (2025) (sub Aspleniaceae): *Athyrium* 71 IS, *Deparia* 10 IS, *Diplazium* 21 IS.

Athyrium × *Cornopteris*° (= *Athyrium* p.p.) **IS** (→ × *Cornoathyrium* Nakaike 1992 New Fl. Japan, Pterid, 840) (nat. hyb.) Knobloch 1996, IPNI 2009 (3 nothospecies), Liu et al. 2020

Athyrium × *Pseudathyrium* (→ × *Schnellerathyrium* Hong M. Liu et al. 2020), Liu et al. 2020 (= *Athyrium* × *reichsteinii* = *A. filix-femina* × *Pseudathyrium distentifolium*, nat. hyb. Central Europe), Wan & Zhang (2022) propose the new name ×°*Apseudathyrium*

Deparia × "*Diplazium*" *subsINUATUM* (= *Deparia lancea*) **IS** (→ × *Depazium* Nakaike 1992 New Fl. Japan, Pterid, 840; *Deparia* p.p.) (nat. hyb.) IPNI 2009 (3 nothospecies: *De. lobatocrenata*; *De. tomitaorana*: according to Sano et al. 2000 one of the putative intergeneric hybrids: *Deparia petersenii* × *Diplazium subsINUATUM* is only interspecific because *Diplazium subsINUATUM* is better placed in *Deparia*).

Deparia × *Neotriblemma*° **IS** (→ × *Neotripleparia* Nakaike 2004 J. Nippon Fernist Club 3 (Suppl. 2): 128; *Deparia* p.p.) IPNI 2011

References:

Sano R et al. (2000) *Diplazium subsINUATUM* and *Di. tomitaroanum* should be moved to *Deparia* according to molecular, morphological, and cytological characters. *J. Plant Res.* 113, 157. <https://doi.org/10.1007/PL00013922>
 Wang X & Zhang L-B (2022) Three new fern names of hybrid genera and four new combinations in Athyriaceae, Osmundaceae, and Thelypteridaceae. *Phytotaxa* 575 <https://doi.org/10.11646/phytotaxa.575.1.8>

Polypodiales: Blechnaceae 24: 265 (excl. Onocleaceae) (1 IG) (suborder Apleninae)

hard-fern or chain-fern family = Rippenfarngewächse

3 subfamilies:

Blechnoideae 18: 238.

Stenochlaenoideae 24: 265.

Woodwardioideae 3: 15.

Blechnoideae 18: 238. 1 IG

Blechnum 30, *Doodia* 19, *Oceanopteris* 8, *Struthiopteris* 5, ...

IS: POWO 2025: *Blechnum* 6 IS.

Doodia × *Oceanopteris* *Doodieae* (→ × *Oceanidoodia* Hong M. Liu et al. 2020) Liu et al. 2020. The two genera are closely related.

Polypodiales: Cystopteridaceae 3: 37. 1 IG (suborder Aspleniinae)

bladder fern family = Blasenfarngewächse

Formerly part of Woodsiaceae.

Monophyletic.

PPG I (2016): *Acystopteris* 3, *Cystopteris* 26, *Gymnocarpium* 8..

Probably **basic type family Cystopteridaceae** (3: 37): The two main and most distant genera (Rothfels et al. 2013, Fig. 4; FOTL v1.7.0) are connected by hybridization though they diverged from each other some 60 million years ago.

IS: POWO (2026) *Cystopteris* 5 IS, *Gymnocarpium* 5 IS.

~~*Asplenium* × *Cystopteris*~~ ~~IF~~ *Aspleniaceae* × *Cystopteridaceae* erroneous (→ × *Asplenicystopteris* P. Fournier 1934 Quatre Fl. France 10) IPNI 2011 (2 nothospecies) → obviously only aberrant forms of *Cystopteris fragilis* and *Dryopteris filix-mas*. For further details see family Aspleniaceae.

Cystopteris × *Gymnocarpium* (→ × *Cystocarpium* [Fraser-Jenk.](#) 2008 [Taxon. Revis. Indian Subcontinental Pteridophytes](#) 207) (nat. hyb.) (French Pyrenees: *C. fragilis* × *G. robertianum* → × *Cystocarpium roskamianum*) Rothfels et al. 2015, Liu et al. 2020 (accepted)

References

FOTL v1.7.0: Fern Tree of Life. Tree Viewer. Retrieved 21.03.2025,
<https://fernphy.github.io/viewer>.

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Polypodiales: Dennstaedtiaceae 10: 265 (suborder Dennstaedtiinae)

bracken family = Adlerfarngewächse

Dennstaedtia 70, *Pteridium* 4,

Polypodiales: Dryopteridaceae 26: 2115 (suborder Polypodiinae)

wood fern family = Wurmfarngewächse

excl. Woodsiaceae (= Athyriaceae) and excl. Tectariaceae.

POWO includes the family in Polypodiaceae.

3 subfamilies:

Dryopteridoideae 6: 1128.

Elaphoglossoideae 11: 883 *Bolbitis* 80, ...

Polybotryoideae 7: 98

Dryopteroideae 6: 1128. 2 IT

3 tribes (en.wikipedia 2025):

Ctenitideae 1: 125 *Ctenitis* 125.

Dryopterideae 2: 460 *Arachniodes* 60, *Dryopteris* 400.

Polysticheae 3: 543 *Cyrtomium* 35, *Phanerophlebia* 8, *Polystichum* 500.

Probably **basic type Dryopteridaceae Dryopteroideae tribes Dryopterideae + Polysticheae** (5: 1003). These two large tribes are connected by hybridization, see the figure below. In addition, at least 184 interspecific hybrids are known. There are no hybrids connecting the monotypic tribe Ctenitideae, so far.

IS: POWO (2025) (sub Polypodiaceae): *Arachniodes* 19 IS, *Ctenitis* 0 IS, *Cyrtomium* 0 IS, *Dryopteris* 95 IS, *Phanerophlebia* 0 IS, *Polystichum* 70 IS.

For manifold interspecific hybrids and hybridogeneous species in *Dryopteris* see also https://en.wikipedia.org/wiki/North_American_Dryopteris_hybrid_complex, and https://theses.cz/id/6m2bli/Hornych_PhD_online.pdf

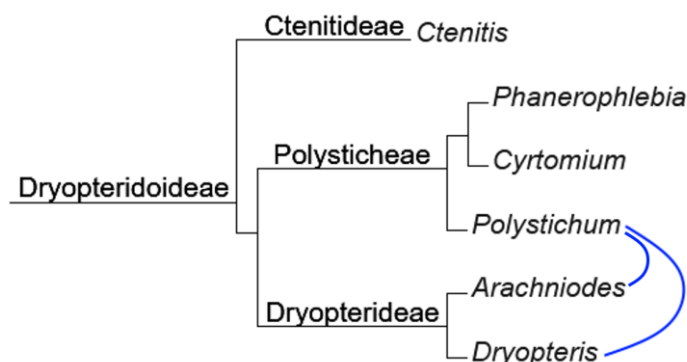
Arachniodes × *Leptorumohra*° (= *Arachniodes* p.p.) **IS Dryopterideae** (→
× *Leptoarachniodes* Nakaike 1992, New Fl. Japan, Pterid., 841; *Arachniodes* p.p.)
Nakaike 2001, IPNI 2009 (2 nothospecies),

Arachniodes simplicior × *Polystichum munitum* **IT Dryopterideae × Polysticheae** see <https://growingfruit.org/t/a-new-suspected-intergeneric-fern-hybrid/76596> ("A new suspected intergeneric fern hybrid! I'm sharing this here because even though it's not about fruit, it's still exciting every time we find out about new species combinations being able to interbreed with each other. It really creates perspective for the evolutionary family tree". Unconfirmed internet entry, but it seems possible.

Dryopteris × *Polystichum* **IT Dryopterideae × Polysticheae** (→ × *Dryostichum* W. H. Wagner 1992 in *Canad. J. Bot* 70 (2): 247). – Three nothospecies have been reported:

1. *D. goldiana* × *P. lonchitis* → × *D. singulare* (nat. hyb.) Wagner 1988, Kubitzki 1990, Wagner et al. 1991/1992, Knobloch 1996, IPNI 2011, Liu et al. 2020.
2. *D. filix-mas* × *P. aculeatum* (→ "× *Dryopolystichum*" recorded by Domin 1942 is doubted by Fraser-Jenkins & Reichstein 1984, p. 169 and Liu et al. 2020.
3. *Dryopteris pseudocaenopteris* (= *Diacalpe*° *aspidioides*) × *Polystichum squarrosum* (→ × *Polysticalpe mirabile* Fraser-Jenk. 1997, *New Sp. Syndrome Indian Pteridol.*, 300) IPNI 2009. After Liu et al. 2020 this hybrid must be transferred to × *Dryostichum*, see also Singh et al. 2025.

Dryopteris filix-mas × *Thelypteris* (= *Oreopteris* = "*Dryopteris*") *limbosperma* **IF Dryopteridaceae × Thelypteridaceae** interfamilial (→ *Dryopteris* "×*digenea*" Domin 1935/36) Domin 1929, Ewan 1944] → erroneous; according to Taylor 1953 this is *Thelypteris limbosperma*, see also Fraser-Jenkins & Reichstein 1984, p. 169



Dryopteridaceae subfamily Dryopteridoideae: hybrids in the phylogeny of Nitta JH et al. (2022) doi:10.3389/fpls.2022.909768.

Polybotryoideae 7: 98. 1 IG

Cyclodium 10, *Polybotrya* 39, ...

Cyclodium × *Polybotrya* **Polybotryoideae** (→ × *Cyclobotrya*) Engels et al. 2017 (*C. meniscoides* × *P. goyazensis*, nat. hyb.), Schwartsburd et al. 2018 (*C. meniscoides* × *P. osmundacea*, nat. hyb.). 2 nothospecies. The two genera are closely related.

References:

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<https://doi.org/10.5281/zenodo.14865023>
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Oreopteris. *Amer. Fern J.* 43, 69–70.*
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Polystichum. *Amer. J. Bot.* 75 (6), pt. 2, abstr. 387.
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 nothogenus from Ontario. *Can. J. Bot.* 70, 245–253.

Polypodiales: Lindsaeaceae 7: 234. 1 IG (suborder Lindsaeinae)

Formerly part of Dennstaedtiaceae or Dryopteridaceae.

Lindsaea 180, *Odontosoria* 23, ...

Lindsaea ensifolia $\times$ *Odontosoria chinensis* ($\rightarrow$ $\times$ *Lindsaeosoria* W. H. Wagner 1993 Contr.
 Univ. Michigan Herb. 19: 72) (nat. hyb., sterile) Wagner 1988, Knobloch 1996, IPNI
 2011, Lehtonen 2018 (confirmed by molecular analysis), Liu et al. 2020. The two
 genera are closely related.

References:

- Lehtonen S (2018) $\times$ *Lindsaeosoria flynnii* (Lindsaeaceae), Another confirmed example
 of deep hybridization among the ferns. *Amer. Fern J.* 108, 7–18.
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 15.

Polypodiales: Polypodiaceae 65: 1652. 6 IG (incl. 1 ISF) (suborder Polypodiinae)

polypody family = Tüpfelfarngewächse

Monophyletic.

POWO 2025 includes family Dryopteridaceae.

6 subfamilies (PPG I 2016):

Drynarioideae 6: 148 *Aglaomorpha* 50 (incl. *Drynaria*°), *Arthromeris* >8, *Gymnogrammitis* 1, *Paraselliguea* 1, *Polypodiopteris* 3. *Selliguea* 85. POWO (2026) lists only 2 genera:

Drynaria = *Aglaomorpha* and *Selliguea*, including the rest.

Grammitoideae 33: 911 *Acrosorus* 9, *Adenophorus* 10, *Cochlidium* (incl. *Xiphopteris*°) *Grammitis* 43, *Prosaptia* (incl. *Ctenopteris*°), ...

Loxogrammoideae 2: 32 *Dictymia* 2, *Loxogramma* 30.

Microsoroideae 12: 183 *Lepisorus* 80, *Leptochilus* 10, *Microsorium* 40, ...

Platycterioideae 2: 70 *Platycterium* 18, *Pyrrosia* 52.

Polypodioideae 9: 305 *Campyloneurum* 50, *Microgramma* 30, *Niphidium* 10, *Pecluma* 40, *Phlebodium* 4, *Pleopeltis* 90 (incl. × *Pleopodium*°), *Pleurosoriopsis* 1, *Polypodium* 40, *Serpocaulon* 40.

Synammia 3: placement uncertain.

Probably **basic type Polypodiaceae** (65: 1652). The genera are connected by 6 intergeneric hybrids, one of them is the interfamilial hybrid × *Phlebodia* (= *Phlebodium* × *Pyrrosia*) connecting subfamilies Polypodioideae + Platycterioideae directly. According to the phylogeny of Janssen et al. (2007) all other subfamilies are indirectly included in the basic type, see the figure below. One exception is the small subfamily Loxogrammoideae (2: 32). Further studies must show if they belong to the same basic time, too.

IS: POWO 2025: *Adenophorus* 2 IS, *Drynaria* 1 IS, *Pleopeltis* 12 IS, *Polypodium* 12 IS, ...

Aglaomorpha coronans × *Drynaria*° *rigidula* (= *Aglaomorpha* p.p.) IS *Drynarioideae* (→ × *Aglaonaria* Hoshiz. 1991 Amer. Fern J. 81 (2), 38) (nat. hyb.) Hoshizaki 1991, Knobloch 1996, IPNI 2009, POWO 2026 (IS of *Drynaria*)

Arthromeris × *Selliguea* *Drynarioideae* (→ × *Sellimeris* Fraser-Jenkins et al. 2018) Fraser-Jenkins et al. 2018 Annot. Checkl. Ind. Pterid. 2: 448, Liu et al. 2020 (accepted), POWO 2025 (IS, synonym of *Selliguea khasiana*)

Colysis° (= *Leptochilus* p.p.) × *Microsorium* *Microsoroideae* Morishige et al. 2008

Ellipinema° (= *Lepisorus* p.p.) × *Lepisorus* IS *Microsoroideae* (→ × *Lepinema*) Zhang & Zhang 2020a (*Ellipinema* has been described in 2020 as a new genus as a segregate of *Lepisorus*), Zhang & Zhang 2020b propose the new name × *Ellipisorus*)

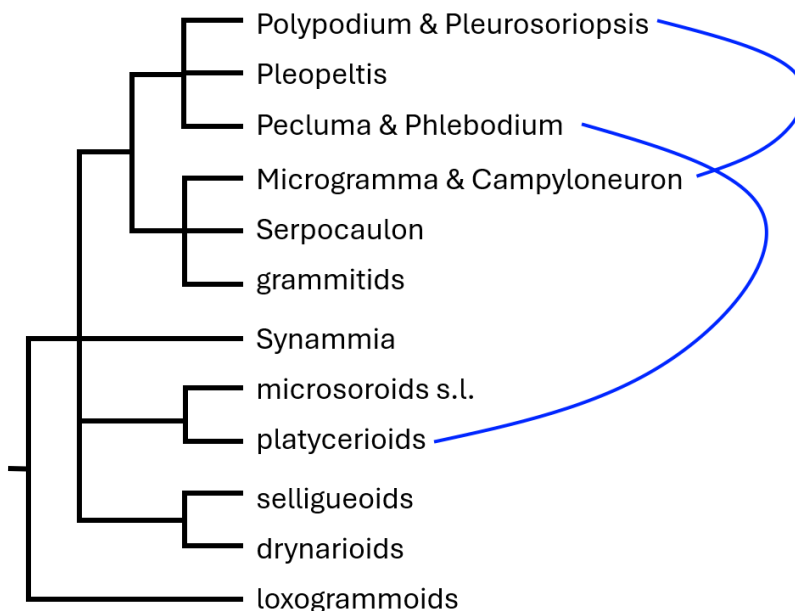
Grammitis × *Prosaptia* (= *Ctenopteris*°) *Grammitoideae* Kubitzki 1990 (4 nothospecies: *C. heterophylla* × *G. billardii* Parris 1977, *C. heterophylla* × *G. magellanica* Parris & Barnett, in prep., *C. longiceps* × *G. sumatrana* Parris 1984, *C. curtisii* (= "*Polypodium decrescens*") × *G. fasciata* [→ *G. × loheriana*] Copeland 1952, 1960), Knobloch 1996

Grammitis × *Xiphopteris*° (= *Cochlidium*) IS *Grammitidoideae* (nat. hyb.) Kubitzki 1990 (*G. subfasciata* × *X. conjunctisora* Parris 1983)

Microgramma lycopodioides × *Polypodium plesiosorum* **Polypodiaceae** (nat. hyb.) Gomez 1975, Knobloch 1996, Checklist of the Ferns and Lycophytes of the World 2025 (*Microgramma* × *moraviana*).

Phlebodium aureum × *Pyrrosia lingua* **ISF Polypodiaceae** × **Platynerioideae** (→ × *Phlebodia louisiana* Viane & Pompe in Fern Gaz. 21, 107 (2020). (Found accidentally in 2014 by JJ Georgusis in his greenhouse. Fertile. Allotetraploid. Meanwhile it is widespread as an ornamental plant. The 2 genera are “separated for at least 35 million years”) POWO 2025

Pleopeltis macrocarpa × *Pleopeltis* (= „*Polypodium*“) *thyssanolepis* **IS Polypodiaceae** (→ × *Pleopodium* E. A. Schelpe & N. C. Anthony (nat. hyb.) Anthony & Schelpe 1985 (but *Pl. macrocarpa* × *Po. polypodioides* is obviously no hybrid, see <http://plants.jstor.org/flora/fta005296>), Mickel & Beitel 1987, Kubitzki 1990, Kew VPGF, Tryon & Stolze 1993, Knobloch 1996, IPNI 2009 (5 nothospecies) (Attention: several species of *Polypodium* have been transferred to *Pleopeltis* by some authors; so, they include the nothogenus × *Pleopodium* in *Pleopeltis*).



Polypodiaceae: hybridization in the phylogeny of Janssen T et al. (2007) Brittonia 59, 159–181. [https://doi.org/10.1663/0007-196X\(2007\)59\[159:OADOAF\]2.0.CO;2](https://doi.org/10.1663/0007-196X(2007)59[159:OADOAF]2.0.CO;2). In the system of PPG I (2016) the first 9 genera of this figure are part of Polypodiaceae, *Synammia* is of uncertain position, “selliguioids” and “drynarioids” are part of Drynarioideae, the rest correspond to the other subfamilies.

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Polypodiales: Pteridaceae 53: 1211 (suborder Pteridinae)

maidenhair fern family, break family = Saumfarngewächse

5 subfamilies:

Cheilanthes 23: 426. The subdivision of this monophyletic group has changed, and many species have been placed in very different genera.

PPG I (2016): *Astrolepis* 8, *Cheilanthes* 100, *Hemionitis* 5, *Myriopteris* 45, *Notholaena* 30, *Pellaea* 40, ... – Alternatively, POWO (2025) places all genera in the single genus *Hemionitis*, see also the reclassification of Schuettpelz et al. (2025).

Cryptogrammoideae 3: 31 *Coniogramme* 20, *Cryptogramma* 10, *Llavea* 1

Parkerioideae 2: 9 *Acrostichum* 3, *Ceratopteris* 6

Pteridoideae 13: 400 *Jamesonia* (incl. *Eriosorus*°) 50, *Pityrogramma* (incl. *Trismeria*) 20,

...

Vittarioideae incl. Adiantaceae 12: 345 *Adiantum* 225, ...

IS: POWO (2025): *Adiantum* 7 IS, *Hemionitis* (sensu subfam. Cheilanthes) 27 IS.

Attention: The systematics is still in flux, so that the cited names are provisional.

Astrolepis (= *Cheilanthes*) *cochinensis* × *Astrolepis* (= *Notholaena*) *sinuata* **IS**

Cheilanthoideae (→ *A. windhamii* (nat. hyb.) Knobloch 1996

“*Cheilanthes skinneri* × *Hemionitis subcordata*” **IS** **Cheilanthoideae** (→ × *Hemionanthes* Mickel 1992 in Fl. Novo-Galiciana 17, 286; = *Cheilanthes gryphus* Mickel 1988) (nat. hyb.) Knobloch 1996, IPNI 2007 (sub Adiantaceae), Liu et al. 2020: incertae sedis. This hybrid has actually been published in 2025 under the name *Ynesmexia* × *gryphus* (Mickel) Fauskee & Windham in Taxon 74 (= *Y. fournieri* × *Y. subcordata*) Fauskee et al. 2025. – The authors add: “*Y. skinneri* s.str. is an allotetraploid between members of the “*subcordata*” and “*seemannii*” subclades.

“*Cheilanthes covillei* × *Notholaena newberryi*” **IS** **Cheilanthoideae** (→ *Cheilanthes* × *fibrillosa*, *Myriopteris* × *fibrillosa*) (nat. hyb., sterile) Lellinger 1985 (Smith), Knobloch 1996. This taxon is placed in *Myriopteris* as *M. × fibrillosa* in the Checklist of the Ferns and Lycophytes of the World 2025.

Coniogramme intermedia × *Dictyogramme*^o (= *Coniogramme*) *japonica* **IS**

Cryptogrammoideae (→ × *Coniodictyogramme fauriei* Nakai 1949 in Bull. Natl. Sci. Mus. 27, 22; *Coniogramme faurei*) (nat. hyb.) Nakai 1949, IPNI (sub Adiantaceae: *C. fraxinea* × *D. japonica*)

Eriosorus^o (= *Jamesonia* p.p.) × *Jamesonia* **IS** **Pteridoideae** (→ × *Eriosonia* Pic. Serm. 1977 in Webbia 31: 242; *Jamesonia*) (nat. hyb.) Tryon 1970, Kubitzki 1990, Knobloch 1996
Hemionitis subcordata × *Pellaea skinneri* **IS** **Cheilanthoideae** (nat. hyb.) Mickel 1984, 1992, Knobloch 1996. This assumed hybrid is identical with × *Hemionanthes*, see “*Cheilanthes skinneri* × *Hemionitis subcordata*”

Pityrogramma × *Trismeria*^o (= *Pityrogramma* p.p.) **IS** **Pteridoideae** (→ × *Pityromeria* L. D. Gomez 1979 in Brenesia 16, 96) (nat. hyb.) IPNI 2007 (sub Adiantaceae)

Ynesmexia, see above

References:

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<https://doi.org/10.1002/tax.13314>, see also <https://www.uni->

goettingen.de/de/hybridization%2C+apomixis+and+polyploidy+in+a+fern+family+%28pteridaceae%29/688124.html

Polypodiales: Tectariaceae 7: 250 (suborder Polypodiinae)

Formerly part of Dryopteridaceae

halberd fern family = Halbmondfarngewächse

Dictyoxiphium^o (= *Tectaria*) *panamense* × *Tectaria incisa martinicensis* **IS** (→ × *Pleuroderris michleriana*) (hybridogeneous taxon = **HY**) Maxon 1934, Wagner et al. 1978, Knobloch 1996, IPNI 2011 (attention: confusingly the basionym of the hybrid is “Dennstaedtiaceae *Lindsaea* × *michleriana* D. C. Eaton 1860 Mem. Amer. Acad. Arts n. s. 8: 213”)

Quercifilix^o (= *Tectaria* p.p.) × *Tectaria* **IS** Manton & Sledge 1954, Knobloch 1996

References:

Manton I & Sledge WA (1954) Observations on the cytology and taxonomy of the pteridophyte flora of Ceylon. Phil. Trans. Roy. Soc. London Ser. B, Biol. Sci. 238 (654), 127–185.

Maxon WR (1934) *Pleuroderris*, a new genus of middle American ferns. J. Wash. Acad. Sci. 24, 549–557.

Schuettpelz E & Pryer KM (2007) Fern phylogeny inferred from 400 leptosporangiate species and three plastid genes. Taxon 56 (4), 1037–1050.

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Wagner WH, Wagner FS & Gomez PLD (1978) The singular origin of a central American fern, *Pleuroderris michleriana*. Biotropica 10, 354–264.

Polypodiales: Thelypteridaceae 36: 1200 (suborder Aspleniinae)

marsh fern family = Sumpffarngewächse

POWO (2025) includes the family in a very broad family Aspleniaceae s. l.

Attempts of a subdivision of the monophyletic family Thelypteridaceae are controversial. APG (2016) accepts 2 subfamilies:

Phegopteroidae 3: 34 *Macrothelypteris* 10, *Phegopteris* 4, *Pseudophegopteris* 20.

Thelypteroidae 33: 1000.

Thelypteroidae (1–)33: 1000. 11 IG

The subdivision is a matter of debate since a long time. Generic names have very often changed. POWO (2025) lumps all taxa in one genus *Thelypteris* s.l., while PPG 2016 accepts as much as 33 genera in 5 tribes; in *Thelypteris* s.str. only 2 species remain.

Amauropelteae 3: 300 *Amauropelta* 232, *Coryphopteris* 70, *Metathelypteris*

Leptogrammeae 3: 31 *Cyclogramma* 9, *Leptogramma* 15, *Stegnogramma* 7

Meniscieae 27: 700 *Abacopteris* 14 (restored 2022), *Amblovenatum*, *Christella* 70, *Cyclosorus* 18, *Glaphyopteridopsis* 12, *Goniopteris* 135, *Grypothrix* 12 (restored 2022), *Menisciopsis* 7, *Meniscium* 27, *Pelazoneuron* 16, *Pneumatopteris* 5, *Pronephrium* 43, *Strophocaulon* (restored 2022), *Trigonospora*, ...

Oreopterideae 1: 2 *Oreopteris* 2

Thelypterideae 1: 2 *Thelypteris* 2

Probably **basic type Thelypteridaceae Thelypterioideae tribe Meniscieae** (27: 700). Many and even very distant genera are connected via hybridization (except *Goniopteris*). Only the most distant of them are entered in the figure below. Outside of tribe *Meniscieae* no intergeneric hybrids are known in the family, but possibly the whole family corresponds to the same basic type (33: 1000).

IS: POWO (2025): *Thelypteris* s.l. 20 IS.

Attention: many names in the list below have been changed since the first date of publication

Abacopteris × *Amblovenatum* see Tseng et al. 2024

Abacopteris × *Christella* (→ × *Abacopterella* T. E. Almeida & A. R. Field in *Austrobaileya* 13: 43 (2023)) 2 nothospecies: Almeida et al. 2023 (*A. aspera* × *C. queenslandica* → × *A. altifrons*), Feng 2025 (*A. nudata* × *C. procera* → × *Abacopterella* × *jerdoni*, basionym *Cyclosorus jerdonii*)

Amblovenatum × *Christella* see Tseng et al. 2024

Amblovenatum × *Strophocaulon* see Tseng et al. 2024

Christella × *Grypothrix* see Tseng et al. 2024, Feng 2025 (→ × *Chririx* Z. H. Feng, nothogen. nov. 2025, *C. procera* × *G. triphylla* → × *Chririx gogoi*, basionym *Thelypteris* × *gogoi*; *C. parasitica* × *G. triphylla* → × *Chririx thwaitesii*, basionym: *Meniscium* × *thwaitesii*)

Christella × *Menisciopsis* (→ × *Christelliopsis* Miles K. Thomas in *Amer. Fern J.* 113: 215 (2023), see Tseng et al. 2024, Feng 2025 (*C. dentata* × *M. penangiana* → × *Christelliopsis nepalensis*, Basionym: *Thelypteris* × *nepalensis*)

Christella × *Pelazoneuron* Knobloch 1996 (2 nothospecies: “*Thelypteris augescens* × *T. ovata*”, sterile; “*T. invis*a × *puberula*”)

Christella × *Pneumatopteris* (→ × *Chrismatopteris* Quansah & D. S. Edwards) (nat. hyb.) Quansah 1985, Knobloch 1996, IPNI 2009 (*C. dentata* × *P. afra*), Liu et al. 2020, Feng 2025 (*C. hispidula* × *P. afra* → × *Chrismatopteris varieevenulosa*, basionym *Thelypteris* × *varieevenulosa*)

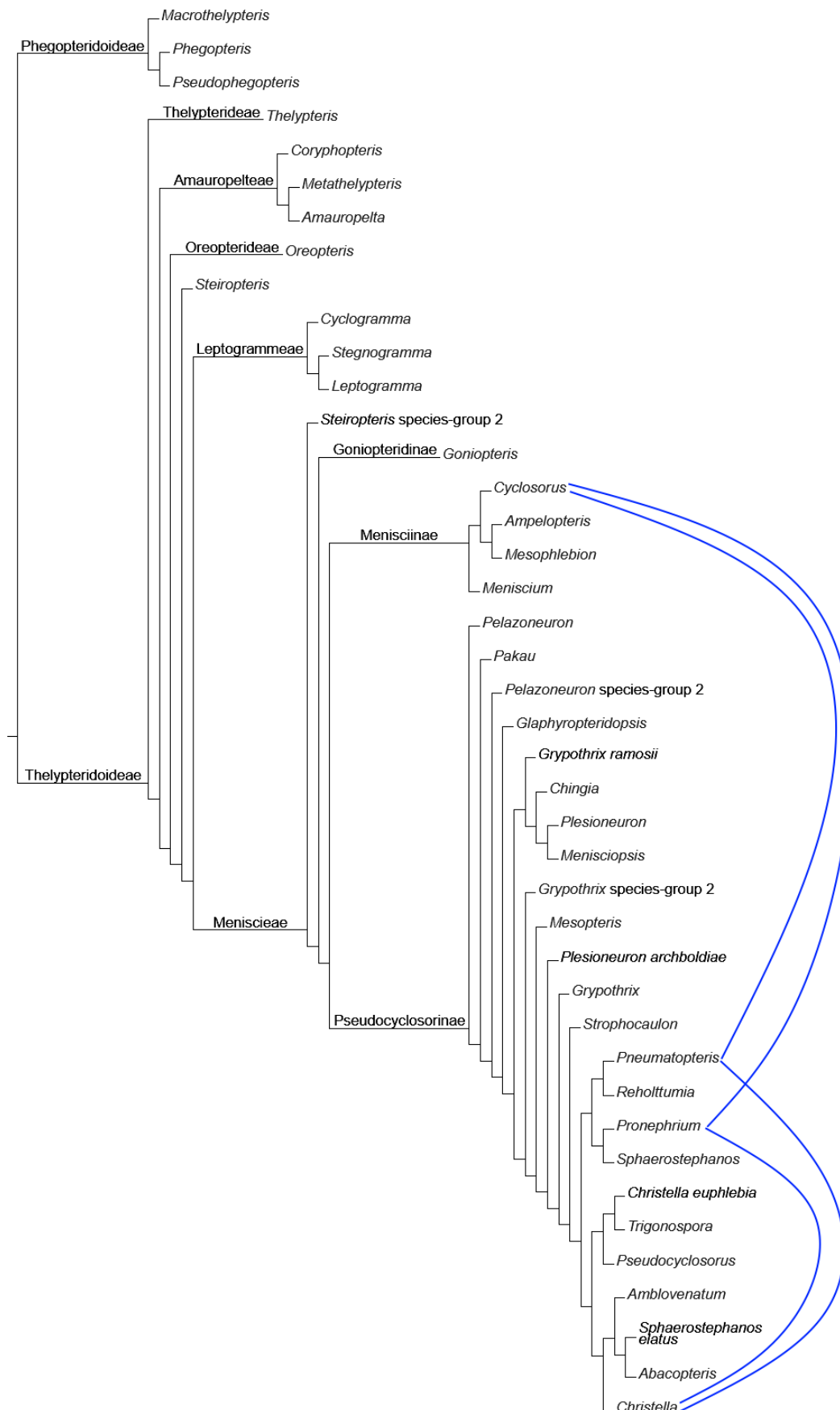
Cyclosorus × *Pronephrium* (→ × *Chrinephrium* Nakaike 1992 *New Fl. Japan*, Pterid., 839) see *Christella* × *Grypothrix* (→ × *Chririx*)

~~*Dryopteris* × *Thelypteris*~~ erroneous: see *Dryopteridaceae*

Glaphyopteridopsis × *Menisciopsis* see Tseng et al. 2024, Feng 2025 (*G. erubescens* × *M. penangiana* → × *Glaphyronisciopsis occulta*, basionym *Nephrodium occultum*)

Glaphyopteridopsis × *Pseudocyclosorus* (= *Cyclosorus* p.p.) (→ × *Glaphypseudosorus*) (*G. erubescens* × *P. esquirolii*) see Liu et al. 2020, see Tseng et al. 2024

Meniscium × *Trigonospora* Knobloch 1996 (*M. thwaitesii* = *triphyllum* × *Trigonospora ciliata* = *tenera*, nat. hyb. Holttum 1971)



Thelypteridaceae: distant hybrids in the phylogeny of Nitta et al. 2022, from en.wikipedia 2025 (CC BY-SA 4.0)..
A few hybrids have to be added in the figure, but they are not important for the basic type question.

References:

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Polypodiales: Woodsiaceae 2: 40. 1 IG (suborder Aspleniinae) cliff fern family = Wimperfarngewächse

Formerly the family was much larger, including Athyriaceae and Cystopteridaceae. Monophyletic (Lu et al. 2020).

We follow Lu et al. (2020) in distinguishing 2 genera:

Physematium 20 (formerly included in *Woodsia*), *Woodsia* 20.

Probably **basic type family Woodsiaceae** (2: 40). The 2 genera have a divergence time of 45 Ma and are connected by hybridization.

IS: POWO (2026): *Physematium* (sub *Woodsia*) 2 IS (*obtusum* × *oreganum* → × *kansanum*; *oreganum* × *P. scopulinum* → × *maxonii*), *Woodsia* 2 IS (*alpina* × *ilvensis* → × *gracilis*; *glabella* × *ilvensis* → × *tryonis*).

Physematium × *Woodsia* (→ × *Woodsimatium* Li Bing Zhang, N. T. Lu & X. F. Gao) Lu et al. 2020 (divergence time 45 Ma; *P. oreganum* × *W. ilvensis* → × *Woodsimatium abbeae*), POWO 2026 (sub *Woodsia* × *abbeae*)

References:

Lu NT et al. (2020) A global plastid phylogeny of the cliff fern family Woodsiaceae and a two-genus classification of Woodsiaceae with the description of *Woodsimatium* nothogen. nov. Taxon 68, 1149–1172.
<https://doi.org/10.1002/tax.12180>

Salviniales 2 families 5: 82

Salviniales: Marsileaceae 3: 61

water ferns = Kleefarngeväxse

Marsilea 55, *Pilularia* 5, *Regnellidium* 1.

IS: POWO (2025): *Marsilea* 1 IS, *Pilularia* 0 IS.

For hybridization experiments see: Buchholz & Selett (1941).

References:

Buchholz JT & Selett JW (1941) The hybridization of water ferns – *Marsilea* and *Pilularia*. The American Naturalist 75 (756), 90–93.
<https://www.journals.uchicago.edu/doi/pdfplus/10.1086/280935>

Salviniales: Salviniaceae 2: 21

floating fern family = Schwimmpfarngewächse

Salvinia 12, *Azolla* 9.

IS: POWO (2024): *Salvinia* 1 IS, *Azolla* 0 IS.

Some *Salvinia*-species are thought to be of hybridogeneous origin.

Schizaeales 3 families 4: 190 + extinct taxa

Monophyletic.

Fronds dimorphic.

Anemiaceae 1: 130.

Ligodiaceae 1: 40.

Schizaeaceae 2: 35 *Actionostachys* 15, *Schizaea* 20.

Schizaeales: Anemiaceae 1: 115

flowering ferns = Blütenfarngewächse

Part of family Schizaeaceae in POWO (2025).

Monophyletic.

Anemia 130.

Probably **basic type family Anemiaceae** (1: 115) as a well-defined taxon. In the fertile fronds, the two lowermost pinnae are modified to bear the sporangia. The species are connected by 12 interspecific hybrids. Further studies must show if the basic type includes other parts of the order.

IS: POWO (2025): *Anemia* 12 IS.