

Alphabetical lists of the vascular plant families with their phylogenetic classification numbers

Listes alphabétiques des familles de plantes vasculaires avec leurs numéros de classement phylogénétique

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KEY-WORDS

<i>Angiosperms</i>	<i>family arrangement</i>
<i>Gymnosperms</i>	<i>Classification</i>
<i>Pteridophytes</i>	<i>APG system</i>
<i>Ferns</i>	<i>PPG system</i>
<i>Lycophytes</i>	<i>phylogeny</i>
<i>Herbarium</i>	

Summary: This paper provides, for herbarium curators, the alphabetical lists of the recognized families in pteridophytes, gymnosperms and angiosperms with their phylogenetic classification numbers.

MOTS-CLÉS

<i>Angiospermes</i>	<i>rangement des familles</i>
<i>Gymnospermes</i>	<i>Classification</i>
<i>Ptéridophytes</i>	<i>système APG</i>
<i>Fougères</i>	<i>système PPG</i>
<i>Lycophytes</i>	<i>phylogénie</i>
<i>Herbier</i>	

Résumé : Cet article produit, pour les conservateurs d'herbier, les listes alphabétiques des familles reconnues pour les ptéridophytes, les gymnospermes et les angiospermes avec leurs numéros de classement phylogénétique.

Introduction

The organization of herbarium collections consists in arranging the specimens logically to find and reclassify them easily in the appropriate storage units. In the vascular plant collections, commonly used methods are systematic classification, alphabetical classification, or combinations of both. In systematically arranged herbaria, the taxa are grouped by affinities which facilitates identification work by comparison (Funk 2003) and allows reduction of specimen movements when adapting to systematic and nomenclatural changes.

The most common reason given for using an alphabetical arrangement is that the specimens are easier to file and locate (Barringer 1999; Gautier & Clerc 2017). This argument is valid for the arrangement of taxa below the rank of family in a general collection. However, at family rank, a systematic classification can be as easy to use as an alphabetical classification provided that families are associated with their classification numbers in alphabetical lists ¹.

These alphabetical lists have been established for the systems of A.-L de Jussieu, A.-P. de Candolle, Bentham & Hooker, etc. that are still used in the management of historical herbaria whose original classification is voluntarily preserved.

Recent classification systems based on molecular phylogenies have developed, and herbaria are gradually adapting to these new and hopefully more stable systems for the arrangement of their general (i.e. non-historical) collections. In order to arrange usual collections systematically, phylogenetic trees were translated into linear sequences of families. Haston *et al.* (2007) devised a linear classification of the angiosperms according to APG II (2003) and allocated a family number to each family. Analogous linear classifications were provided for extant lycophytes and ferns (Christenhusz *et al.*, 2011b; PPG I 2016), and for extant gymnosperms (Christenhusz *et al.*, 2011a). The angiosperm classification was updated according to APG IV (2016). However, these linear classifications have not provided alphabetical lists

1. A systematic classification can be also advantageous for arrangement below the rank of family, depending on the herbarium type, such as a monographic collection or a regional collection referring to a regional systematic flora.

which would locate reliably, a family in the herbarium. To fill this gap, this paper provides, for herbarium curators, the alphabetical lists of recognized families in pteridophytes, gymnos-

perms and angiosperms with the phylogenetic classification numbers allocated by the PPG I (2016), Christenhusz *et al.* (2011a), and the APG IV (2016) respectively.

1. Alphabetical list of pteridophyte families with their phylogenetic classification numbers

Anemiaceae..... 15	Equisetaceae 4	Oleandraceae.....49
Aspleniaceae 37	Gleicheniaceae..... 12	Onocleaceae.....39
Athyriaceae 41	Hemidictyaceae 36	Ophioglossaceae6
Blechnaceae 40	Hymenophyllaceae..... 9	Osmundaceae8
Cibotiaceae 22	Hypodematiaceae 44	Plagiogyriaceae21
Culcitaceae 20	Isoëtaceae 2	Polypodiaceae51
Cyatheaceae 25	Lindsaeaceae 29	Psilotaceae5
Cystodiaceae 27	Lomariopsidaceae 47	Pteridaceae30
Cystopteridaceae..... 32	Lonchitidaceae 28	Rhachidosoraceae33
Davalliaceae..... 50	Loxosomataceae 19	Saccolomataceae26
Dennstaedtiaceae..... 31	Lycopodiaceae 1	Salviniaceae.....16
Desmophlebiaceae..... 35	Lygodiaceae 13	Schizaeaceae14
Dicksoniaceae 24	Marattiaceae 7	Selaginellaceae3
Didymochlaenaceae .. 43	Marsileaceae 17	Tectariaceae48
Diplaziopsidaceae 34	Matoniaceae 10	Thelypteridaceae.....42
Dipteridaceae 11	Metaxyaceae 23	Thyrsopteridaceae18
Dryopteridaceae 45	Nephrolepidaceae 46	Woodsiaceae.....38

2. Alphabetical list of gymnosperm families with their phylogenetic classification numbers

Araucariaceae..... 8	Ginkgoaceae3	Sciadopityaceae..... 10
Cupressaceae 11	Gnetaceae5	Taxaceae..... 12
Cycadaceae 1	Pinaceae.....7	Welwitschiaceae4
Ephedraceae 6	Podocarpaceae9	Zamiaceae2

3. Alphabetical list of angiosperm families with their phylogenetic classification numbers

The following families are listed under their descriptive as well as their alternative names as authorized by article 18.5 of the ICN (Turland et al., 2018): Compositae/Asteraceae, Cruciferae/Brassicaceae, Guttiferae/Clusiaceae, Leguminosae/Fabaceae, Umbelliferae/Apiaceae, Gramineae/Poaceae, Labiatae/Lamiaceae, Palmae/Arecaceae, and

Acanthaceae..... 377	Apiaceae.....416	Begoniaceae.....166
Achariaceae 199	Apocynaceae356	Berberidaceae110
Achatocarpaceae..... 296	Apodanthaceae159	Berberidopsidaceae..272
Acoraceae..... 27	Aponogetonaceae 34	Betulaceae158
Actinidiaceae 342	Aquifoliaceae392	Biebersteiniaceae235
Adoxaceae..... 408	Araceae 28	Bignoniaceae378
Aextoxicaceae 271	Araliaceae414	Bixaceae.....250
Aizoaceae 304	Arecaceae..... 76	Blandfordiaceae63
Akaniaceae..... 254	Argophyllaceae399	Bonnetiaceae182
Alismataceae..... 30	Aristolochiaceae 12	Boraginaceae357
Alseuosmiaceae 397	Asparagaceae..... 74	Boryaceae62
Alstroemeriaceae..... 55	Asphodelaceae..... 72	Brassicaceae270
Altingiaceae 123	Asteliaceae..... 64	Bromeliaceae.....91
Alzateaceae 221	Asteraceae.....403	Brunelliaceae.....175
Amaranthaceae..... 297	Asteropeiaceae292	Bruniaceae.....406
Amaryllidaceae..... 73	Atherospermataceae . 22	Burmanniaceae44
Amborellaceae 1	Austrobaileyaceae 5	Burseraceae238
Anacampserotaceae. 316	Balanopaceae.....193	Butomaceae31
Anacardiaceae 239	Balanophoraceae.....275	Buxaceae117
Ancistrocladaceae.... 288	Balsaminaceae.....325	Byblidaceae374
Anisophylleaceae..... 160	Barbeuiaceae302	Cabombaceae3
Annonaceae 18	Barbeyaceae144	Cactaceae317
Aphanopetalaceae ... 131	Basellaceae312	Calceolariaceae.....368
Aphloiaceae..... 223	Bataceae261	Calophyllaceae184

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Calycanthaceae	19	Combretaceae	214	Dichapetalaceae	195
Calyceraceae	402	Commelinaceae	78	Didiereaceae.....	311
Campanulaceae.....	394	Compositae	403	Dilleniaceae	120
Campynemataceae.....	51	Connaraceae	170	Dioncophyllaceae	287
Canellaceae	8	Convolvulaceae	359	Dioscoreaceae.....	45
Cannabaceae	149	Coriariaceae.....	162	Dipentodontaceae	234
Cannaceae	86	Cornaceae	324	Dipterocarpaceae	253
Capparaceae.....	268	Corsiaceae.....	52	Dirachmaceae.....	145
Caprifoliaceae	409	Corynocarpaceae.....	161	Doryanthaceae	67
Cardiopteridaceae ...	389	Costaceae	88	Droseraceae.....	284
Caricaceae	257	Crassulaceae	130	Drosophyllaceae	286
Carlemanniaceae	365	Crossosomataceae	229	Ebenaceae.....	334
Caryocaraceae	187	Cruciferae	270	Ecdeiocoleaceae	102
Caryophyllaceae	295	Crypteroniaceae	220	Elaeagnaceae	146
Casuarinaceae.....	156	Ctenolophonaceae	178	Elaeocarpaceae.....	173
Celastraceae	168	Cucurbitaceae.....	163	Elatinaceae	191
Centroplacaceae.....	190	Cunoniaceae	172	Emblingiaceae	263
Cephalotaceae	174	Curtisiaceae	322	Ericaceae	345
Ceratophyllaceae	104	Cyclanthaceae.....	49	Eriocaulaceae	94
Cercidiphyllaceae	125	Cymodoceaceae	41	Erythroxyllaceae	180
Chloranthaceae.....	26	Cynomoriaceae	135	Escalloniaceae	404
Chrysobalanaceae....	197	Cyperaceae	98	Eucommiaceae	350
Circaeasteraceae.....	107	Cyrillaceae	344	Euphorbiaceae	207
Cistaceae	251	Cytinaceae.....	244	Euphroniaceae	196
Cleomaceae	269	Daphniphyllaceae.....	126	Eupomatiaceae	17
Clethraceae	343	Dasyogonaceae	75	Eupteleaceae	105
Clusiaceae	183	Datisceae	165	Fabaceae.....	140
Colchicaceae.....	56	Degeneriaceae	15	Fagaceae	153
Columelliaceae.....	405	Diapensiaceae.....	338	Flagellariaceae	100

Fouquieriaceae	328	Hernandiaceae.....	23	Lardizabalaceae	108
Francoaceae	213	Himantandraceae	16	Lauraceae	25
Frankeniaceae.....	280	Huaceae	169	Lecythidaceae.....	330
Garryaceae	351	Humiriaceae	198	Leguminosae	140
Geissolomataceae.....	224	Hydatellaceae	2	Lentibulariaceae	379
Gelsemiaceae	355	Hydrangeaceae	320	Lepidobotryaceae	167
Gentianaceae.....	353	Hydrocharitaceae	32	Liliaceae.....	60
Geraniaceae	212	Hydroleaceae	363	Limeaceae.....	299
Gerrardinaceae	231	Hydrostachyaceae	319	Limnanthaceae.....	258
Gesneriaceae.....	369	Hypericaceae	186	Linaceae.....	208
Gisekiaceae	303	Hypoxidaceae	66	Linderniaceae.....	373
Gomortegaceae	21	Icacinaceae	348	Loasaceae	321
Goodeniaceae.....	401	Iridaceae	70	Loganiaceae.....	354
Goupiaceae.....	201	Irvingiaceae	177	Lophiocarpaceae	300
Gramineae.....	103	Iteaceae.....	127	Lophopyxidaceae	188
Griseliniaceae	412	Ixioliriaceae	68	Loranthaceae.....	279
Grossulariaceae	128	Ixonanthaceae	209	Lowiaceae	83
Grubbiaceae.....	323	Joinvilleaceae.....	101	Lythraceae	215
Guamatelaceae.....	227	Juglandaceae.....	155	Macarthuriaceae	293
Gunneraceae	119	Juncaceae	97	Magnoliaceae.....	14
Guttiferae	183	Juncaginaceae.....	35	Malpighiaceae	192
Gyrostemonaceae	266	Kewaceae	301	Malvaceae	247
Haemodoraceae	81	Kirkiaceae	237	Marantaceae.....	87
Halophytaceae	313	Koeberliniaceae	260	Marcgraviaceae	326
Haloragaceae	134	Krameriaceae.....	137	Martyniaceae.....	375
Hamamelidaceae	124	Labiatae	383	Maundiaceae	36
Hanguanaceae	77	Lacistemataceae	203	Mayacaceae	95
Heliconiaceae.....	84	Lamiaceae.....	383	Mazaceae	384
Helwingiaceae.....	391	Lanariaceae	65	Melanthiaceae	53

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Melastomataceae 219	Ochnaceae181	Phellinaceae398
Meliaceae 243	Olacaceae273	Philesiaceae57
Menispermaceae..... 109	Oleaceae.....366	Philydraceae.....79
Menyanthaceae..... 400	Onagraceae216	Phrymaceae385
Metteniusaceae 349	Oncothecaceae347	Phyllanthaceae211
Microteaceae..... 294	Opiliaceae274	Phyllonomaceae390
Misodendraceae..... 277	Orchidaceae 61	Physenaceae291
Mitrastemonaceae ... 346	Orobanchaceae387	Phytolaccaceae305
Molluginaceae..... 309	Oxalidaceae171	Picramniaceae230
Monimiaceae 24	Paeoniaceae122	Picrodendraceae210
Montiaceae..... 310	Palmae 76	Piperaceae11
Montiniaceae 361	Pandaceae176	Pittosporaceae413
Moraceae..... 150	Pandanaceae..... 50	Plantaginaceae370
Moringaceae 256	Papaveraceae.....106	Platanaceae114
Muntingiaceae 245	Paracryphiaceae407	Plocospermataceae...364
Musaceae 85	Passifloraceae202	Plumbaginaceae282
Myodocarpaceae..... 415	Paulowniaceae.....386	Poaceae103
Myricaceae 154	Pedaliaceae376	Podostemaceae185
Myristicaceae 13	Penaeaceae222	Polemoniaceae329
Myrothamnaceae..... 118	Pennantiaceae410	Polygalaceae142
Myrtaceae 218	Pentadiplandraceae..265	Polygonaceae283
Nartheciaceae 43	Pentaphragmataceae395	Pontederiaceae80
Nelumbonaceae 113	Pentaphylacaceae332	Portulacaceae315
Nepenthaceae 285	Penthoraceae133	Posidoniaceae.....39
Neuradaceae 246	Peraceae.....205	Potamogetonaceae38
Nitrariaceae 236	Peridiscaceae121	Primulaceae.....335
Nothofagaceae 152	Petenaeeaceae232	Proteaceae115
Nyctaginaceae..... 308	Petermanniaceae..... 54	Putranjivaceae189
Nymphaeaceae 4	Petiveriaceae306	Quillajaceae139
Nyssaceae..... 318	Petrosaviaceae..... 42	Rafflesiaceae.....206

Ranunculaceae.....	111	Setchellanthaceae ...	259	Thomandersiaceae ...	381
Rapateaceae	92	Simaroubaceae	242	Thurniaceae.....	96
Resedaceae	267	Simmondsiaceae	290	Thymelaeaceae	249
Restionaceae	99	Siparunaceae	20	Ticodendraceae	157
Rhabdodendraceae ..	289	Sladeniaceae	331	Tofieldiaceae	29
Rhamnaceae.....	147	Smilacaceae	59	Toricelliaceae.....	411
Rhizophoraceae	179	Solanaceae	360	Tovariaceae	264
Ripogonaceae	58	Sphaerosepalaceae ..	248	Trigoniaceae	194
Roridulaceae	341	Sphenocleaceae	362	Trimeniaceae.....	6
Rosaceae.....	143	Stachyuraceae.....	228	Triuridaceae	46
Rousseaceae	393	Staphyleaceae	226	Trochodendraceae....	116
Rubiaceae	352	Stegnospermataceae	298	Tropaeolaceae	255
Ruppiaceae	40	Stemonaceae	48	Typhaceae.....	90
Rutaceae	241	Stemonuraceae	388	Ulmaceae	148
Sabiaceae.....	112	Stilbaceae	372	Umbelliferae.....	416
Salicaceae	204	Strasburgeriaceae....	225	Urticaceae	151
Salvadoraceae	262	Strelitziaceae.....	82	Vahliaceae	358
Santalaceae	276	Stylidiaceae	396	Velloziaceae	47
Sapindaceae	240	Styracaceae	339	Verbenaceae	382
Sapotaceae	333	Surianaceae	141	Violaceae.....	200
Sarcobataceae	307	Symplocaceae	337	Vitaceae	136
Sarcolaenaceae	252	Talinaceae	314	Vochysiaceae	217
Sarraceniaceae.....	340	Tamaricaceae.....	281	Winteraceae	9
Saururaceae	10	Tapisciaceae.....	233	Xeronemataceae	71
Saxifragaceae	129	Tecophilaeaceae	69	Xyridaceae	93
Scheuchzeriaceae.....	33	Tetracarpaeaceae ...	132	Zingiberaceae	89
Schisandraceae	7	Tetrachondraceae....	367	Zosteraceae.....	37
Schlegeliaceae	380	Tetramelaceae	164	Zygophyllaceae.....	138
Schoepfiaceae	278	Tetrameristaceae	327		
Scrophulariaceae	371	Theaceae	336		

Conclusion

The problem with herbarium arrangements is that they do not last; no sooner a classification is established than it is already obsolete. Hopefully next linear classifications and alphabetical lists will be published simultaneously to facilitate their application in herbaria.

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