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SYNOPSIS OF A PUTATIVELY PHYLOGENETIC CLASSIFICATION OF THE FLOWERING PLANTS

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INTRODUCTION

The classification of the class Angiospermae presented here is the culmination of more than 15 years effort to express as accurately as present knowledge permits the phylogenetic relationships among the higher taxa of flowering plants. In the course of 30 years of floristic and other phytogeographic studies, considerable botanical collecting and observation on all the continents, and visits to many of the world's major botanical gardens, I have had the good fortune to collect or observe in living condition representatives of all but 44 of the 312 families accepted here. I have studied preserved or dried herbarium materials of representatives of the 44 missed families, mostly monogeneric taxa of Africa and South America. In more than 10 years of library research I have gleaned from numerous publications data relevant to a better understanding of the relationships, origins, and classification of the angiosperms. Particularly helpful have been reports of original research on vegetative anatomy, floral morphology, palynology, embryology, phytochemistry, cytology, phytogeography, and paleobotany. Many of these publications are too recent to have been available to the earlier phylogenists.

Feeling strongly that new systems of classification should be published only with accompanying thorough documentation and explanation, I have resisted until now the many requests to publish my system. I am completing a book in which the system will be discussed at considerable length and will be thoroughly documented with the listing of extensive bibliography, keyed by author's name and date of publication cited after each involved order and family. However, it will probably be a year or two before the book is in print, and the pressure of requests for the system from authors of floras, teachers of plant taxonomy, students of various botanical disciplines, and members of the Editorial Committee of the *Flora North America Project* makes immediate publication of even this naked synopsis seem desirable.

Although this system of classification has not had wide exposure in the taxonomic community, it and earlier versions of it have been studied by a good many taxonomy students at the Universities of Iowa, Hawaii, and California at Riverside, the Claremont Graduate School, and perhaps other institutions. I have sent it to or discussed it at length with many botanical colleagues in this country

and abroad. An earlier version was used experimentally in my annotated check list of the vascular plants of Johnson County, Iowa (1955), though I now much prefer an alphabetical arrangement, at least within classes or subclasses, for florulas. At the Tenth International Botanical Congress at Edinburgh (1964) I presented my realignment of the "ranalian" families in the Annonales, Berberidales, Nymphaeales, and Hamamelidales. More recently (1966) I used my classification in the rather esoteric journal *Bio-Philately* to list the families and subfamilies of flowering plants represented on postage stamps of the world. At that time, incidentally, there were 225 families and subfamilies (or composite tribes) of 144 different angiosperm families so represented. I have also published (1958, 1963), with some discussion and examples, the guiding principles that I have followed in developing this classification.

ACKNOWLEDGMENTS

In the construction of this classification I am indebted deeply to all the phylogenists and numerous other botanists who have published before me on the various taxa of Angiospermae. I am particularly indebted to such morphologists as Carl Wilson, A. J. Eames, C. R. Metcalfe, and my esteemed Claremont colleague Sherwin Carlquist for their invaluable suggestions and their encouragement of my phylogenetic efforts. I am also most grateful to the United States Educational Foundation and the National Science Foundation for making possible extensive field research in Australasia and Malesia and study of critical groups and literature at the Royal Botanic Gardens, Kew, and the British Museum (Natural History), London, through their generous awards in 1959 and 1960 of Fulbright Research Scholarships to the University of Queensland, a Senior Postdoctoral Fellowship, and N. S. F. Grant No. 6484. Without these two years of botanical travel and study I would not feel competent to present this system of classification.

EXPLANATION OF THE SYNOPSIS

I have carried the synopsis down to the subfamily category, and in the Asteraceae down to the tribe since in that huge family it is quite possible that the tribes will ultimately be treated as subfamilies. In this age of taxonomic inflation, my treatment of orders, families, and perhaps other taxa will probably seem rather inclusive and conservative. I think, however, that phylogeny is better served and teaching of taxonomy made easier by avoiding unnecessary fragmentation. I have tried to be as consistent as possible throughout the system in the size of the discontinuities that I accept to separate related groupings of each major category. This has led to the demotion of some familiar families, such as the Amaryllidaceae, Apiaceae, Asclepiadaceae, etc. No new family names have needed proposal here. The names chosen for the various taxa are according to the *International Code of Botanical Nomenclature* (1966), although I have extended the principle of priority up to the class. My point of departure for ordinal names is Lindley's *Nixus Plantarum* (1833). I have avoided use of synonyms except where the names or my circumscriptions of families or subfamilies deviate considerably from those in A. Engler's *Syllabus der Pflanzenfamilien*, Ed. 12, Vol. 2, edited by Melchior (1964).

SYNOPSIS OF A CLASSIFICATION OF THE CLASS ANGIOSPERMAE

Subclass: DICOTYLEDONEAE

- Superorder: Annoniflorae
 Order: Annonales
 Suborder: Winterineae
 Family: Winteraceae
 Suborder: Illicineae
 Family: Illiciaceae
 Family: Schisandraceae
 Suborder: Magnoliineae
 Family: Magnoliaceae
 Subfamily: Magnolioideae
 Subfamily: Liriodendroideae
 Family: Degeneriaceae
 Family: Eupomatiaceae
 Family: Himantandraceae
 Suborder: Annonineae
 Family: Annonaceae
 Subfamily: Annonoideae
 Subfamily: Monodoroideae
 Family: Myristicaceae
 Family: Canellaceae
 Suborder: Aristolochineae
 Family: Aristolochiaceae
 Suborder: Laurineae
 Family: Austrobaileyaceae
 Family: Chloranthaceae
 Family: Amborellaceae
 Family: Trimeniaceae
 Family: Monimiaceae
 Subfamily: Hortonioideae
 Subfamily: Atherospermatoideae
 Subfamily: Monimioideae
 Subfamily: Siparunoideae
 Family: Calycanthaceae
 Family: Lactoridaceae
 Family: Gomortegaceae
 Family: Lauraceae
 Subfamily: Lauroideae
 Subfamily: Cassythoideae
 Family: Hernandiaceae
 Family: Gyrocarpaeae
 Suborder: Piperineae
 Family: Piperaceae
 Family: Saururaceae
 Order: Berberidales
 Suborder: Berberidineae
 Family: Lardizabalaceae
 Family: Sargentodoxaceae
 Family: Menispermaceae
 Family: Ranunculaceae
 Subfamily: Hydrastoideae
 Subfamily: Helleboroideae
 Subfamily: Ranunculoideae
 Subfamily: Kingdonioideae
 Family: Berberidaceae
 Subfamily: Berberidoideae
 Subfamily: Nandinoideae
 Subfamily: Epimedioideae
 Subfamily: Podophylloideae
 Suborder: Papaverineae
 Family: Papaveraceae
 Subfamily: Platystemonoideae
 Subfamily: Chelidonioideae
 Subfamily: Eschscholzioideae
 Subfamily: Papaveroideae
 Subfamily: Pteridophylloideae
 Subfamily: Hypicoideae
 Subfamily: Fumarioideae
 Superorder: Nymphaeiflorae
 Order: Nymphaeales
 Family: Nymphaeaceae
 Subfamily: Nymphaeoidae
 Subfamily: Nelumboideae
 Subfamily: Cabomboideae
 Family: Ceratophyllaceae
 Superorder: Sarraceniiflorae
 Order: Sarraceniales
 Family: Sarraceniaceae
 Superorder: Theiflorae
 Order: Theales
 Suborder: Dilleniineae
 Family: Dilleniaceae
 Subfamily: Tetraceroidae
 Subfamily: Dillenioideae
 Family: Paeoniaceae
 Suborder: Theineae
 Family: Actinidiaceae
 Subfamily: Actinidoideae
 Subfamily: Saurauioideae
 Subfamily: Clematoclethroideae
 Family: Stachyuraceae
 Family: Theaceae
 Subfamily: Theoideae
 Subfamily: Ternstroemioidae
 Subfamily: Bonnetioideae
 Subfamily: Asteropeioideae
 Subfamily: Tetrameristoideae
 Subfamily: Pellicerioideae
 Family: Aquifoliaceae
 Family: Marcgraviaceae
 Family: Caryocaraceae
 Suborder: Clethrineae
 Family: Clethraceae
 Family: Cyrillaceae
 Family: Pentaphylacaceae
 Suborder: Scytopetalineae
 Family: Ochnaceae

- Suborder: Scytopetalineae (cont.)
 - Family: Quinaceae
 - Family: Scytopetalaceae
 - Family: Sarcolaenaceae
 - Family: Strasburgeriaceae
 - Family: Dipterocarpaceae
 - Subfamily: Dipterocarpoideae
 - Subfamily: Monotoideae
 - Family: Dioncophyllaceae
- Suborder: Hypericineae
 - Family: Clusiaceae
 - Subfamily: Kielmeyeroideae
 - Subfamily: Calophylloideae
 - Subfamily: Clusioideae
 - Subfamily: Moronoboideae
 - Subfamily: Lorostemmonoideae
 - Subfamily: Hypericoideae
 - Family: Elatinaceae
- Suborder: Lecythidineae
 - Family: Lecythidaceae
 - Subfamily: Planchonioideae
 - Subfamily: Lecythidoideae
 - Subfamily: Napoleonoideae
- Order: Nepenthales
 - Family: Nepenthaceae
- Order: Ericales
 - Suborder: Ericineae
 - Family: Ericaceae
 - Subfamily: Rhododendroideae
 - Subfamily: Vaccinioideae
 - Subfamily: Arbutoideae
 - Subfamily: Ericoideae
 - Subfamily: Pyroloideae
 - Subfamily: Monotropoideae
 - Family: Epacridaceae
 - Suborder: Empetrineae
 - Family: Empetraceae
- Order: Ebenales
 - Suborder: Sapotineae
 - Family: Ebenaceae
 - Family: Sapotaceae
 - Subfamily: Sideroxyloideae
 - Subfamily: Omphalocarpoideae
 - Subfamily: Sapotoideae
 - (Achradoideae)
 - Subfamily: Madhucoideae
 - Subfamily: Sarcospermatoideae
 - Suborder: Styracineae
 - Family: Symplocaceae
 - Family: Lissocarpaceae
 - Family: Styracaceae
- Order: Primulales
 - Family: Myrsinaceae
 - Subfamily: Myrsinoideae
 - Subfamily: Maesoideae
 - Subfamily: Aegiceratoideae
 - Family: Theophrastaceae
 - Family: Primulaceae
- Order: Plumbaginales
 - Family: Plumbaginaceae
 - Subfamily: Plumbaginoideae
 - Subfamily: Staticoideae
- Superorder: Rafflesiflorae
 - Order: Rafflesiales
 - Family: Rafflesiaceae
 - Subfamily: Cytinoideae
 - Subfamily: Apodanthoideae
 - Subfamily: Rafflesioideae
 - Subfamily: Mitrastemmonoideae
 - Family: Hydnoraceae
- Superorder: Cistiflorae
 - Order: Cistales
 - Suborder: Cistaceae
 - Family: Flacourtiaceae
 - Family: Dipentodontaceae
 - Family: Peridicaceae
 - Family: Scyphostegiaceae
 - Family: Violaceae
 - Subfamily: Violoideae
 - Subfamily: Leonioideae
 - Family: Bixaceae
 - Subfamily: Bixioideae
 - Subfamily: Cochlospermoideae
 - Suborder: Caricineae
 - Family: Turneraceae
 - Family: Malesherbiaceae
 - Family: Passifloraceae
 - Family: Achariaceae
 - Family: Caricaceae
 - Suborder: Cucurbitineae
 - Family: Cucurbitaceae
 - Subfamily: Cucurbitoideae
 - Subfamily: Zanonioideae
 - Suborder: Begoniineae
 - Family: Begoniaceae
 - Family: Datisceae
 - Suborder: Loasineae
 - Family: Loasaceae
 - Subfamily: Mentzelioidae
 - Subfamily: Loasoideae
 - Subfamily: Gronovioideae
- Order: Salicales
 - Family: Salicaceae
- Order: Tamaricales
 - Family: Tamaricaceae
 - Family: Frankeniaceae
- Order: Capparidales
 - Family: Capparidaceae (incl. *Oceanopapaver*, *Tovaria*)
 - Subfamily: Capparidoideae
 - Subfamily: Cleomoideae
 - Family: Moringaceae
 - Family: Resedaceae
 - Family: Brassicaceae
- Superorder: Malviiflorae
 - Order: Malvales
 - Family: Sterculiaceae
 - Family: Sphaerosepalaceae
 - Family: Elaeocarpaceae

Order: Malvales (cont.)

Family: Tiliaceae

Subfamily: Brownlowioideae

Subfamily: Tetralicoideae

Subfamily: Tilioideae

Subfamily: Neotessmannioideae

Family: Bombacaceae

Family: Malvaceae

Order: Urticales

Family: Ulmaceae

Subfamily: Ulmoideae

Subfamily: Celtidoideae

Family: Moraceae

Subfamily: Moroiideae

Subfamily: Cannabinoideae

Family: Urticaceae

Subfamily: Conocephaloideae

Subfamily: Urticoideae

Order: Rhamnales

Family: Rhamnaceae

Family: Elaeagnaceae

Order: Euphorbiales

Family: Euphorbiaceae

(incl. *Picrodendron*)

Subfamily: Phyllanthoideae

Subfamily: Oldfieldioideae

Subfamily: Euphorbioideae

Family: Pandaceae

Family: Aextoxicaceae

Family: Didymelaceae

Family: Dichapetalaceae

Family: Thymelaeaceae

Subfamily: Gonystyloideae

Subfamily: Aquillarioideae

Subfamily: Gilgiodaphnoideae

Subfamily: Thymelaeoideae

Family: Buxaceae

Order: Solanales

Suborder: Solanineae

Family: Solanaceae

Subfamily: Nolanoideae

Subfamily: Solanoideae

Subfamily: Duckeodendroideae

Family: Convolvulaceae

Subfamily: Humbertoideae

Subfamily: Dichondroideae

Subfamily: Convolvuloideae

Subfamily: Cuscutoideae

Suborder: Polemoniineae

Family: Polemoniaceae

Suborder: Fouquieriineae

Family: Fouquieriaceae

Order: Campanulales

Family: Pentaphragmataceae

Family: Campanulaceae

Subfamily: Campanuloideae

Subfamily: Cyphioideae

Subfamily: Lobelioideae

Subfamily: Sphenocloideae

Family: Goodeniaceae

Subfamily: Goodenioideae

Subfamily: Leschenaultioideae

Subfamily: Dampierioideae

Subfamily: Brunonioideae

Superorder: Santaliflorae

Order: Santalales

Suborder: Celastrineae

Family: Celastraceae

Subfamily: Celastroideae

Subfamily: Tripterygioideae

Subfamily: Cassinoideae

Subfamily: Hippocrateoideae

Subfamily: Goupioideae

Subfamily: Siphonodonoideae

Family: Stackhousiaceae

Subfamily: Macgregorioideae

Subfamily: Stackhousioideae

Suborder: Icacinineae

Family: Icacinaceae

Family: Cardiopteridaceae

Family: Medusandraceae

Suborder: Santalineae

Family: Olacaceae

Subfamily: Schoepfioideae

Subfamily: Olacoideae

Family: Opiliaceae

Family: Santalaceae

Family: Misodendraceae

Family: Loranthaceae

Family: Viscaceae

Family: Balanophoraceae

Subfamily: Mystropetaloidae

Subfamily: Dactylanthoideae

Subfamily: Sarcophytoideae

Subfamily: Helosidoideae

Subfamily: Lophophytoideae

Subfamily: Balanophoroideae

Suborder: Cynomoriineae

Family: Cynomoriaceae

Order: Oleales

Family: Salvadoraceae

Family: Oleaceae

Subfamily: Jasminoideae

Subfamily: Oleoideae

Superorder: Geraniiflorae

Order: Geraniales

Suborder: Lineae

Family: Linaceae

Subfamily: Humirioideae

Subfamily: Linoideae

Subfamily: Ctenolophonoideae

Subfamily: Ixonanthoideae

Family: Ancistrocladaceae

Family: Erythroxylaceae

Family: Zygophyllaceae

Subfamily: Peganoideae

Subfamily: Chitonioideae

Subfamily: Tetradiclidoideae

Subfamily: Augeoideae

Subfamily: Zygophylloideae

- Family: Zygophyllaceae (cont.)
 - Subfamily: Nitrarioideae
- Suborder: Geraniineae
 - Family: Oxalidaceae
 - Family: Geraniaceae
 - Family: Balsaminaceae
 - Family: Tropaeolaceae
- Suborder: Limnanthineae
 - Family: Limnanthaceae
- Suborder: Polygalineae
 - Family: Malpighiaceae
 - Subfamily: Hiraeeoideae
 - Subfamily: Malpighioideae
 - Family: Polygalaceae
 - Family: Krameriaceae
 - Family: Trigoniaceae
 - Family: Vochysiaceae
- Superorder: Rutiflorae
 - Order: Rutales
 - Suborder: Rutineae
 - Family: Rutaceae
 - Subfamily: Rutoideae
 - Subfamily: Dictyolomatoideae
 - Subfamily: Flindersioideae
 - Subfamily: Spathelioideae
 - Subfamily: Toddaloideae
 - Subfamily: Aurantioideae
 - Subfamily: Rhabdodendroideae
 - Family: Simaroubaceae
 - Subfamily: Simarouboideae
 - Subfamily: Kirkioidae
 - Subfamily: Irvingioideae
 - Subfamily: Balanitoideae
 - Subfamily: Picramnioideae
 - Subfamily: Alvaradoideae
 - Family: Surianaceae
 - Family: Cneoraceae
 - Family: Meliaceae
 - Subfamily: Cedreloideae
 - Subfamily: Swietenioideae
 - Subfamily: Melioideae
 - Family: Burseraceae
 - Family: Anacardiaceae
 - (incl. Julianaceae)
 - Suborder: Sapindineae
 - Family: Sapindaceae
 - Subfamily: Dodonaeoideae
 - Subfamily: Sapindoideae
 - Family: Sabiaceae
 - Family: Melianthaceae
 - Family: Akaniaceae
 - Family: Aceraceae
 - Family: Hippocastanaceae
 - Family: Bretschneideraceae
 - Suborder: Juglandineae
 - Family: Rhoipteleaceae
 - Family: Juglandaceae
 - Subfamily: Pterocaryoideae
 - Subfamily: Juglandoideae
 - Order: Myricales
 - Family: Myricaceae
- Order: Leitneriales
 - Family: Leitneriaceae
- Superorder: Chenopodiiflorae
 - Order: Chenopodiales
 - Suborder: Chenopodiineae
 - Family: Phytolaccaceae
 - Subfamily: Phytolaccoideae
 - Subfamily: Stegnospermatoideae
 - Subfamily: Microtoideae
 - Subfamily: Achatocarpoideae
 - Family: Gyrostemonaceae
 - Family: Nyctaginaceae
 - Family: Aizoaceae
 - Subfamily: Molluginoideae
 - Subfamily: Aizooideae
 - Subfamily: Tetragonioideae
 - Family: Cactaceae
 - Subfamily: Pereskioideae
 - Subfamily: Opuntioideae
 - Subfamily: Cactoideae
 - Family: Didiereaceae
 - Family: Portulacaceae
 - Subfamily: Portulacoidae
 - Subfamily: Montioideae
 - Family: Basellaceae
 - Family: Chenopodiaceae
 - (incl. *Dysphania*)
 - Family: Halophytaceae
 - Family: Amaranthaceae
 - Subfamily: Amaranthoideae
 - Subfamily: Gomphrenoideae
 - Suborder: Caryophyllineae
 - Family: Caryophyllaceae
 - Subfamily: Paronychioideae
 - Subfamily: Alsinoideae
 - Subfamily: Caryophylloideae
 - Family: Polygonaceae
 - Subfamily: Eriogonoideae
 - Subfamily: Polygonoideae
 - Subfamily: Coccoleboideae
 - Order: Batidales
 - Family: Batidaceae
- Superorder: Hamamelidiflorae
 - Order: Hamamelidales
 - Suborder: Trochodendrineae
 - Family: Trochodendraceae
 - Family: Tetracentraceae
 - Family: Eupteleaceae
 - Family: Cercidiphylloideae
 - Suborder: Eucommineae
 - Family: Eucommiaceae
 - Suborder: Hamamelidineae
 - Family: Hamamelidaceae
 - Subfamily: Disanthoideae
 - Subfamily: Hamamelidoideae
 - Subfamily: Rhodoleioideae
 - Subfamily: Symingtonioideae
 - Subfamily: Liquidambaroideae
 - Family: Platanaceae

Superorder: Hamamelidiflorae (cont.)

- Order: Casuarinales
 - Family: Casuarinaceae
- Order: Fagales
 - Family: Fagaceae
 - Subfamily: Fagoideae
 - Subfamily: Castaneoideae
 - Family: Betulaceae
- Order: Balanopales
 - Family: Balanopaceae
- Superorder: Rosiflorae
 - Order: Rosales
 - Suborder: Rosineae
 - Family: Rosaceae
 - Subfamily: Spiraeoideae
 - Subfamily: Rosoideae
 - Subfamily: Maloideae
 - Subfamily: Neuroideae
 - Subfamily: Prunoideae
 - Subfamily: Chrysobalanoideae
 - Family: Crossosomataceae
 - Family: Connaraceae
 - Subfamily: Jollydoroideae
 - Subfamily: Connarioideae
 - Family: Fabaceae
 - Subfamily: Mimosoideae
 - Subfamily: Caesalpinoideae
 - Subfamily: Faboideae
 - Suborder: Saxifragineae
 - Family: Crassulaceae
 - Subfamily: Sedoideae
 - Subfamily: Sempervivoideae
 - Subfamily: Echeverioideae
 - Subfamily: Cotyledonoideae
 - Subfamily: Kalanchoideae
 - Subfamily: Crassuloideae
 - Family: Cephalotaceae
 - Family: Saxifragaceae
 - Subfamily: Penthoroideae
 - Subfamily: Saxifragoideae
 - Subfamily: Ribesioideae
 - Subfamily: Vahlloideae
 - Subfamily: Francooideae
 - Subfamily: Eremosynoideae
 - Subfamily: Lepuropetaloidae
 - Subfamily: Parnasioideae
 - Subfamily: Pterostemonoideae
 - Subfamily: Hydrangeoideae
 - Subfamily: Tetracarpaeoideae
 - Subfamily: Iteoideae
 - Subfamily: Brexioideae
 - Subfamily: Escallonioidae
 - Subfamily: Columelloideae
 - Subfamily: Montinioideae
 - Subfamily: Phyllonomoideae
 - Family: Styliaceae
 - Subfamily: Donatioideae
 - Subfamily: Styliidoideae
 - Family: Droseraceae
 - Family: Greyiaceae

- Family: Podostemaceae
 - Subfamily: Tristichioideae
 - Subfamily: Podostemoideae
- Family: Diapensiaceae
- Suborder: Cunoniineae
 - Family: Cunoniaceae (incl. *Bauera*)
 - Family: Brunelliaceae
 - Family: Davidsoniaceae
 - Family: Eucryphiaceae
 - Family: Medusagynaceae
 - Family: Staphyleaceae
 - Subfamily: Staphyleoideae
 - Subfamily: Tapiscioideae
 - Family: Corynocarpaceae
- Suborder: Coriariineae
 - Family: Coriariaceae
- Order: Pittosporales
 - Suborder: Daphniphyllineae
 - Family: Daphniphyllaceae
 - Suborder: Pittosporineae
 - Family: Pittosporaceae
 - Family: Byblidaceae
 - Family: Tremandraceae
 - Suborder: Brunineae
 - Family: Roridulaceae
 - Family: Bruniaceae
 - Family: Geissolomataceae
 - Family: Grobbiaceae
 - Family: Myrothamnaceae
 - Family: Hydrostachyaceae
- Superorder: Proteiflorae
 - Order: Proteales
 - Family: Proteaceae
 - Subfamily: Proteoideae
 - Subfamily: Grevilleoideae
- Superorder: Myrtiflorae
 - Order: Myrtales
 - Family: Lythraceae
 - (incl. Sonneratiaceae)
 - Family: Punicaceae
 - Family: Crypteroniaceae
 - Family: Trapaceae
 - Family: Combretaceae
 - Family: Oliaceae
 - Family: Penaeaceae
 - Family: Myrtaceae
 - Subfamily: Leptospermoideae
 - Subfamily: Myrtoideae
 - Family: Melastomataceae
 - Subfamily: Melastomatoideae
 - Subfamily: Astronioideae
 - Subfamily: Memecyloideae
 - Family: Onagraceae
- Superorder: Gentianiflorae
 - Order: Gentianales
 - Family: Loganiaceae
 - Subfamily: Loganioideae
 - Subfamily: Desfontainioideae
 - Subfamily: Buddlejoideae
 - Family: Rubiaceae

- Family: Rubiaceae (cont.)
 - Subfamily: Cinchonoideae
 - Subfamily: Guettardoideae
 - Subfamily: Ixoroideae
 - Subfamily: Rubioideae
 - Subfamily: Henriquezioideae
 - Family: Apocynaceae
 - Subfamily: Plumerioideae
 - Subfamily: Cerberioideae
 - Subfamily: Apocynoideae
 - Subfamily: Periplocoideae
 - Subfamily: Secamonoideae
 - Subfamily: Asclepiadoideae
 - Family: Gentianaceae
 - Family: Menyanthaceae
 - Order: Bignoniales
 - Family: Bignoniaceae
 - Family: Pedaliaceae
 - Family: Martyniaceae
 - Family: Myoporaceae
 - Family: Scrophulariaceae
 - (incl. Globulariaceae)
 - Family: Plantaginaceae
 - Family: Orobanchaceae
 - Family: Lentibulariaceae
 - Family: Acanthaceae
 - Subfamily: Nelsonioideae
 - Subfamily: Thunbergioideae
 - Subfamily: Mendoncioideae
 - Subfamily: Acanthoideae
 - Family: Gesneriaceae
 - Subfamily: Cyrtandroideae
 - Subfamily: Gesnerioideae
 - Superorder: Corniflorae
 - Order: Cornales
 - Suborder: Rhizophorineae
 - Family: Rhizophoraceae
 - Suborder: Vitineae
 - Family: Vitaceae
 - Subfamily: Vitoideae
 - Subfamily: Leeoideae
 - Suborder: Cornineae
 - Family: Nyssaceae
 - Subfamily: Davidioideae
 - Subfamily: Nyssoidae
 - Family: Cornaceae
 - Subfamily: Mastixioideae
 - Subfamily: Curtisioideae
 - Subfamily: Helwingioideae
 - Subfamily: Torricelloideae
 - Subfamily: Cornoideae
 - Family: Alangiaceae
 - Family: Garryaceae
 - Suborder: Haloragidineae
 - Family: Haloragidaceae
 - Subfamily: Haloragidoideae
 - Subfamily: Gunneroideae
 - Family: Hippuridaceae
 - Suborder: Araliineae
 - Family: Araliaceae
 - Subfamily: Aralioideae
 - Subfamily: Hydrocotyloideae
 - Subfamily: Saniculoideae
 - Subfamily: Apioideae
 - Order: Dipsacales
 - Family: Caprifoliaceae
 - Family: Adoxaceae
 - Family: Valerianaceae
 - Family: Dipsacaceae
 - Family: Calyceraceae
- Superorder: Lamiiflorae
 - Order: Lamiales
 - Suborder: Boraginineae
 - Family: Hydrophyllaceae
 - Family: Boraginaceae
 - Subfamily: Cordioideae
 - Subfamily: Ehretioideae
 - Subfamily: Heliotropoideae
 - Subfamily: Boraginoideae
 - Subfamily: Wellstedioideae
 - Family: Lennoaceae
 - Family: Hoplestigmataceae
 - Suborder: Lamiineae
 - Family: Verbenaceae
 - Subfamily: Viticoideae
 - Subfamily: Chloanthoideae
 - Subfamily: Verbenoideae
 - Subfamily: Phrymangoideae
 - Subfamily: Nyctanthoideae
 - Subfamily: Caryopteridoideae
 - Subfamily: Stilboideae
 - Subfamily: Symphorematoideae
 - Subfamily: Avicennioideae
 - Family: Callitricaceae
 - Family: Lamiaceae
 - Subfamily: Prostantheroideae
 - Subfamily: Ajugoideae
 - Subfamily: Prasioideae
 - Subfamily: Ocimoideae
 - Subfamily: Catopheroideae
 - Subfamily: Lavanduloideae
 - Subfamily: Scutellarioideae
 - Subfamily: Lamioidae
 - (Stachyoideae)
 - Subfamily: Tetrachondroideae
- Superorder: Asteriflorae
 - Order: Asterales
 - Family: Asteraceae
 - Tribe: Mutisieae
 - Tribe: Vernonioeae
 - Tribe: Eupatorioeae
 - Tribe: Cardueae
 - Tribe: Arctoteae
 - Tribe: Cichorieae
 - Tribe: Inuleae
 - Tribe: Heliantheae
 - (incl. Helenieae)
 - Tribe: Astereae
 - Tribe: Anthemideae
 - Tribe: Senecioneae
 - Tribe: Calenduleae

Subclass: MONOCOTYLEDONEAE

Superorder: Alismiflorae

Order: Alismales

Family: Butomaceae

Family: Alismaceae

Subfamily: Limnocharitoideae

Subfamily: Alismoideae

Family: Hydrocharitaceae

Subfamily: Hydrocharitoideae

Subfamily: Vallisnerioideae

Subfamily: Thalassioideae

Subfamily: Halophiloideae

Order: Zosterales

Suborder: Aponogetonineae

Family: Aponogetonaceae

Suborder: Potamogetonineae

Family: Scheuchzeriaceae

Subfamily: Scheuchzerioideae

Subfamily: Juncaginoideae

Family: Potamogetonaceae

Family: Posidoniaceae

Family: Zannichelliaceae

Suborder: Zosterineae

Family: Zosteraceae

Order: Najadales

Family: Najadaceae

Superorder: Triuridiflorae

Order: Triuridales

Family: Triuridaceae

Superorder: Liliiflorae

Order: Liliales

Suborder: Liliineae

Family: Liliaceae

Subfamily: Melanthioideae

Subfamily: Herrerioideae

Subfamily: Asphodeloideae

Subfamily: Dracaenoideae

Subfamily: Xanthorrhoeoideae

Subfamily: Wurmbaeoideae

Subfamily: Lilioideae

Subfamily: Scilloideae

Subfamily: Allioideae

Subfamily: Alstroemerioideae

Subfamily: Ixiolirioideae

Subfamily: Amaryllidoideae

Subfamily: Agavoideae

Subfamily: Hypoxidoideae

Subfamily: Haemodoroideae

Subfamily: Cyanastroideae

Subfamily: Asparagoideae

Subfamily: Ophiopogonoideae

Subfamily: Aletroideae

Subfamily: Luzuriagoideae

Subfamily: Smilacoideae

Family: Roxburghiaceae

Family: Dioscoreaceae

Family: Taccaceae

Family: Velloziaceae

Suborder: Iridineae

Family: Iridaceae (incl. *Geostiris*)

Family: Burmanniaceae

Subfamily: Burmannioideae

Subfamily: Corsioideae

Suborder: Orchidineae

Family: Orchidaceae

Subfamily: Apostasioideae

Subfamily: Cyrtopodioideae

Subfamily: Neottioideae

Subfamily: Orchidoideae

Subfamily: Epidendroideae

Superorder: Ariflorae

Order: Arales

Suborder: Arineae

Family: Araceae

Subfamily: Acoroideae

Subfamily: Pothoideae

Subfamily: Monsteroideae

Subfamily: Calloideae

Subfamily: Lasioideae

Subfamily: Philodendroideae

Subfamily: Colocasioideae

Subfamily: Aroideae

Subfamily: Pistioideae

Family: Lemnaceae

Subfamily: Lemnoideae

Subfamily: Wolffioideae

Suborder: Typhineae

Family: Sparganiaceae

Family: Typhaceae

Order: Arecales

Family: Arecaceae

Subfamily: Coryphoideae

Subfamily: Phoenicoideae

Subfamily: Borassoideae

Subfamily: Caryotoideae

Subfamily: Lepidocaryoideae

Subfamily: Cocosioideae

Subfamily: Arecoideae

Subfamily: Phytelephantoideae

Subfamily: Nypoideae

Order: Cyclanthales

Family: Cyclanthaceae

Subfamily: Carludovicoideae

Subfamily: Cyclanthoideae

Order: Pandanales

Family: Pandanaceae

Superorder: Commeliniflorae

Order: Commelinales

Suborder: Bromelilineae

Family: Bromeliaceae

Subfamily: Pitcairnioideae

Subfamily: Tillandsioideae

Subfamily: Bromelioideae

Family: Rapateaceae

Subfamily: Saxofridericioideae

Family: Rapateaceae (cont.)
 Subfamily: Rapateoideae
 Family: Xyridaceae
 Suborder: Pontederiineae
 Family: Pontederiaceae
 Family: Philydraceae
 Suborder: Juncineae
 Family: Juncaceae (incl. *Thurnia*)
 Family: Cyperaceae
 Subfamily: Cyperoideae
 Subfamily: Caricoideae
 Suborder: Commelinineae
 Family: Commelinaceae
 Family: Mayacaceae
 Suborder: Eriocaulineae
 Family: Eriocaulaceae
 Subfamily: Eriocauloideae
 Subfamily: Paepalanthoideae
 Suborder: Flagellariineae
 Family: Flagellariaceae
 Family: Restionaceae
 Family: Centrolepidaceae

Suborder: Poineae
 Family: Poaceae
 Subfamily: Streptochaetoideae
 Subfamily: Bambusoideae
 Subfamily: Parioideae
 Subfamily: Oryzoideae
 Subfamily: Micraioideae
 Subfamily: Pooideae
 Subfamily: Centothecoideae
 Subfamily: Eragrostoideae
 Subfamily: Panicoideae
 Order: Zingiberales
 Family: Musaceae
 Subfamily: Strelitzioideae
 Subfamily: Musoideae
 Subfamily: Heliconioideae
 Family: Lowiaceae
 Family: Zingiberaceae
 Subfamily: Zingiberoideae
 Subfamily: Costoideae
 Family: Cannaceae
 Family: Marantaceae

REFERENCES CITED

- International Bureau for Plant Taxonomy and Nomenclature. 1966. International Code of Botanical Nomenclature. Utrecht, 399 p.
- Lindley, J. 1833. *Nixus Plantarum*. London, 28 p.
- Melchior, H. (Ed.) 1964. *A. Engler's Syllabus der Pflanzenfamilien*, 12th Ed., Vol. 2, Berlin, 666 p.
- Thorne, R. F. 1955. The flora of Johnson County, Iowa. *Proc. Iowa Acad. Sci.* 62: 155-196.
- , 1958. Some guiding principles of angiosperm phylogeny. *Brittonia* 10: 155-196.
- , 1963. Some problems and guiding principles of angiosperm phylogeny. *Am. Naturalist* 97: 287-305.
- , 1964. Some realignments in the Angiospermae as suggested by a synthesis of botanical information. *In Tenth International Bot. Cong. Abstracts*, Edinburgh, p. 302.
- , 1966. Families and subfamilies of flowering plants represented on postage stamps. *Bio-Philately* 16(2): 48-60.