

Flora of the Carolinas, Virginia, and Georgia

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by

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Flora of the Carolinas, Virginia, and Georgia -- Current Status

The publication thirty years ago of the *Manual of the Vascular Flora of the Carolinas*, by A.E. Radford, H.E. Ahles, and C.R. Bell, was a landmark. It was the result of an extraordinary effort to document the flora of the Carolinas, and after its publication, the existence of "the *Manual*" helped generate an interest in and further studies of the flora of the region. Since its publication in 1968, many additional species have been documented as part of the region's flora, additional alien species have become naturalized, new species have been described, monographs have given new taxonomic insights into groups, nomenclature accepted in 1968 has been found to be invalid, new and more reliable keys have been developed, and systematic treatments have (one hopes) generally advanced. Increasingly, identification of the flora of our area (and other states of the Southeast and Mid-Atlantic) by academic researchers, agency personnel, and advanced amateurs is hampered by the lack of an up-to-date flora. Without such a flora, identification must involve reference to herbaria and thousands of monographs, papers, and other floras -- resources not readily available to many people who need them. The absence in the region of a single-source modern standard for the systematic treatment, nomenclature, and identification of the flora compromises scientific studies, ecological research, and agency inventory, management, and monitoring of ecosystem and species biodiversity.

Current Status. Since 1990, I (and collaborators) have been working on a new treatment of the flora of the Carolinas, Virginia, and Georgia, to fill the need for a new standard reference to aid in the consistent identification of the flora of the region. While building on the tradition of the *Manual*, the *Flora* is not a revision or second edition; it takes some different approaches, has features the *Manual* lacks, lacks features the *Manual* has, and has a somewhat expanded geographic scope. Initial draft treatments are now complete for about 90% of families, genera, and species, based on extensive research in the field, library, and herbarium. Prior to publication, additional herbarium research and annotation (based primarily at the UNC Herbarium, but involving other collections with regional coverage) and field testing will be completed. This work will of course result in changes to draft treatments.

The *Flora* will include treatment of all species in the **Carolinas, Virginia, and Georgia** (the primary flora area), with less detailed treatment of species occurring in physiographically and phytogeographically closely related portions of the adjacent states of **Alabama, e. and c. Tennessee, e. Kentucky, West Virginia, se. and sc. Pennsylvania, District of Columbia, Maryland, Delaware, and s. New Jersey** (the secondary flora area). Approximately 4300 species and infraspecific taxa are recognized for the primary flora area (Carolinas and Virginia), with an additional 700 taxa from the secondary flora area. **Approximately 5700 taxa will be keyed and treated.** Originally, Georgia was part of the secondary flora area, but has been added to the primary area. The treatments are being revised gradually to reflect this change.

Publication of the first edition is projected to occur in several years, and to be intermediate in format and content between a "guide" (such as Wofford, Clewell, or Wunderlin) and a full "manual" (such as Radford, Ahles, & Bell, Fernald, or Gleason & Cronquist). For instance, full descriptions of each genus and species will not be included in the first edition, but detailed discussion of taxonomy, habitats, and rarity, comparison to unrelated but similar species, extensive bibliography (providing access to systematic, ecological, and population biology literature), and illustrations will be included. A "county dot map atlas" for the flora area is planned (and initial steps are underway), but will be issued as a separate publication at a later date.

Current review copies are available at any time from the author (over 1000 have already been distributed). These are being distributed in order to improve the quality of the formally published edition, by generating substantial review and comment prior to publication by a wide variety of users. Copies are provided at cost of xerox reproduction. The *Flora* can also be downloaded in pdf files from the website of the University of North Carolina Herbarium (www.herbarium.unc.edu).

Features

Taxonomic treatment. Taxonomic treatments generally follow recent monographic and revisionary work, but an effort is made to provide a certain rough consistency of "splitting" vs. "lumping" across different taxonomic groups. As is generally true in recent treatments, generic and family concepts are often narrower than those used in the "RAB Manual", based on new evidence, including (but not limited to) cladistic methods applied to morphologic and molecular data. Ironically, these results have often resulted in a validation of earlier, narrower generic (and familial) concepts espoused by Small, Rydberg, and others. Varieties are less frequently recognized than by Fernald, though a considerable number of species and infraspecific taxa "lumped" by RAB are recognized (generally following more recent monographic or revisionary work). Some taxa not formally recognized are discussed and characters for their recognition provided.

Detailed keys. Keys are subjected to rigorous testing in the field and herbarium, by hundreds of users. To the degree feasible, keys are structured to emphasize characters that are readily observable and available for long parts of the year, such as vegetative characters (of course, this is not possible for all groups). Multiple characters are provided. Terminology strives to avoid abstruse technical terms which do not significantly add meaning (for some genera, an introduction to morphological characters and terms used is provided as "Identification notes" preceding the key). Geographic distributions and habitats are sometimes included in the keys as pragmatic, useful, secondary "characters," but are placed in brackets to indicate that they are not "true" characters. The keys include all species from the primary flora area (North Carolina, South Carolina, and Virginia), as well as all species occurring in a broader secondary area. The inclusion in the keys of taxa from the broader, secondary area will facilitate the discovery of

range extensions, as well as extending the usefulness of the **Flora** to a broader geographic area. In some cases, several alternate keys are provided. The primary emphasis of the keys is pragmatism -- effective and efficient identification. For this reason, a key to a genus sometimes includes closely similar taxa not in the genus that may be mistaken for it. Another example is that the "family key" to ferns and fern allies is actually a key to genera, allowing an emphasis in the key on readily observable characteristics, rather than the technical characters often needed to distinguish fern families. Keys are based on herbarium specimens, though reference is made when live characters may differ from those of pressed specimens. Some keys have been adapted from literature cited; where the adaptation is particularly close, credit is given to the source by specific citation. All keys should be regarded as "draft"; many will be substantially altered prior to publication, based on additional field and herbarium testing.

Habitat. Information is provided about the habitat of the taxon. Especially for more localized, specialized, or rare taxa, the habitat is described in considerable detail. Supplemental habitat information for GA rare species is taken from online information posted by the Georgia Natural Heritage Program.

Native status. The native or alien status is stated. If there is a question, that is mentioned or discussed. For aliens, an opinion is given as to whether the taxon is naturalized, persistent, waif, etc. in the primary flora area.

Flowering/fruitlet dates. Flowering and fruiting dates are provided for the primary flora area, in a format similar to the Manual. These are derived from herbarium specimens viewed by the author (collected from within the Flora area), from field observations by the author (within the Flora area), and from literature cited.

Distribution of species. A statement of the rangewide distribution of each taxon treated is provided. This is based on published distribution maps and distribution statements in other floras, amended and improved by additional herbarium specimens and published records (such as the "Noteworthy Collections" section in Castanea). The distribution within the primary area is provided by state and physiographic province.

Literature. Nearly all genera have citations to recent, pertinent systematic literature, as well as more limited citations to literature on ecology and population biology. The intent is to provide the user with access into more detailed literature, and to document the literature basis of the treatment followed in the **Flora**. So far, about 1500 references are cited, and more will be added prior to publication.

Synonymy. Cited synonymy is provided to regional floras, monographs, revisions, and other significant floristic treatments. This allows comparison of the treatment in the Flora to other treatments, and convenient access to the other treatments. Synonymy is provided comprehensively for the following floras: Radford, Ahles, & Bell (1968); Small (1933); Fernald (1950); Gleason and Cronquist 1st edition (1952); Godfrey & Wooten (1979, 1981); Vascular Flora of the Southeastern States (Cronquist 1980, Isely 1990); Wofford (1989); Gleason and Cronquist 2nd edition (1991); Kartesz (1999); and Flora of North America (1993, 1997, 2000). Also, cited synonymy is provided for some families to other important and influential works, such as Hitchcock & Chase for grasses, Correll for orchids, Luer for orchids, Mackenzie for *Carex*, Wilbur for legumes (1961), etc. Synonymy used in recent monographs and revisions is also cited. All names attributed to the **Flora** area in other floras, monographs, and revisions are accounted for.

Rarity. Species monitored as rare, threatened, or endangered by the state agencies of North Carolina, South Carolina, and Virginia, or by the U.S. Fish and Wildlife Service, are so indicated. While the details of rarity status will change, this will still provide the user a preliminary indication that the taxon is one of conservation concern.

Comments and discussion. Miscellaneous comments and discussion are provided for many species and genera, including discussion of biogeography, more details on distribution of rare species, additional notes on identification not included in the keys, information of particular interest on species biology and ecology, habitat, uses, discovery in the flora area or a state, etc. These "idiosyncratic comments" (as they have been called) add to the general usefulness and interest of what is intended to be a rigorous, practical, and interesting flora.

Introduction

The understanding of the flora of the Carolinas, Virginia, and Georgia has progressed substantially since the publication thirty years ago of the landmark **Manual of the Vascular Flora of the Carolinas**, by A.E. Radford, H.E. Ahles, and C.R. Bell. Many additional species have been documented as part of the region's flora, additional alien species have become naturalized, new species have been described, monographs have given new taxonomic insights into groups, nomenclature accepted in 1968 has been found to be invalid, new and more reliable keys have been developed, and systematic treatments have advanced. Increasingly, identification of the flora of our area (and other states of the Southeast and Mid-Atlantic) by academic researchers, agency personnel, and advanced amateurs is hampered by the lack of an up-to-date flora. Without such a flora, identification must involve reference to herbaria and thousands of monographs, papers, and other floras -- resources not readily available to most people who need them. The absence in the region of a modern standard for the systematic treatment, nomenclature, and identification of the flora compromises scientific studies, ecological research, and agency inventory, management, and monitoring of ecosystems and rare species.

I intend this new flora for the Carolinas, Virginia, and Georgia to fulfill part of the need, until a thorough revision of the **Manual** is feasible. The emphasis of the **Flora** is on workable and detailed keys to all taxa, emphasizing vegetative characters where

possible (to extend the period of the year in which species can be identified), detailed description of known habitats in the 3-state region, additional characters or hints useful in discrimination from similar species (including species not closely related but superficially similar and therefore confused), reference to the body of recent literature various aspects of the flora of our area, and discussion of abundance, phytogeography, and ecology. Our knowledge of the flora of our region is far poorer than is generally recognized, and past floras have sometimes contributed to this impression, by obscuring taxonomic judgments or "lumping" poorly known taxa. An attempt is here made to draw attention to taxonomic questions or controversies, while at the same time presenting (as best as possible) a useable, current, consensus treatment. In making taxonomic decisions, I have generally relied strongly on recent monographs and revisions and the checklist of Kartesz (1999) (reviewed by hundreds of experts), but have tempered published treatments with field knowledge, examination of herbarium material, and consultation with other botanists in the region. While reluctant to disagree with recent monographs (by authors who have studied the groups in more detail than I have), I have also attempted to impose a somewhat consistent concept of taxonomic categories (family, genus, species, subspecies, and variety), so as not to have a very uneven treatment, with some genera divided finely and others coarsely.

The geographic scope of the *Flora* is Virginia, North Carolina, South Carolina, and Georgia. The three recent atlases of the Virginia flora (the most recent being Harvill et al., 1992) have done much to elucidate the state's flora, and to encourage a new wave of floristic exploration. The addition of the state of Virginia to the geographical scope covered by Radford, Ahles, & Bell offers a number of advantages. The four-state region is a compact and relatively natural unit; Virginia, with its strong representation of Southern Appalachian and Southeastern Coastal Plain species, has stronger floristic affinities to the Carolinas than to states to its north and west, with which it has often been treated in the past (as in Fernald, Gleason & Cronquist, etc.). The four-state coverage will provide botanists working primarily in one state with a greater regional perspective, and should promote an increased knowledge of each state's flora, by making readily available information on species nearby.

Taxonomic Philosophy

The concept that floras should be "conservative" (i.e. should take a "lumping" approach) strikes me as dangerous. Horton (1972), for instance, states "manual treatments in general should be conservative, leaving the fine points of distinction among taxa, especially infraspecific ones, to the monographer." Floras become the standard used by the great majority of users in an area, and taxa that are "lumped" are lost to the consciousness of all botanists other than a few specialists. Thus, two parallel taxonomies are established, one in common use and one (based on the best judgments of experts in the groups) not used, except by a few, interested in (and able to) seek out the papers of specialists. Ecological studies, species lists for parks or natural areas, rare species surveys, and assessments of the ecological significance of potential conservation areas are all flawed if not based on the best current information available. Moreover, from the standpoint of information theory and information management, a species list using a "lumped" taxonomy has lost information; if a "split" taxonomy has been used, the information is retained.

Even a casual perusal of the synonymy listed under the species of nearly any substantial genus in our flora will reveal taxa that have been variously treated as species, infraspecific taxa (variety or subspecies), and included within another taxon. Further studies, sometimes based on different techniques, sometimes simply by a different taxonomist with a different taxonomic philosophy, often result in the overturning of a previous taxonomic judgment. The basic categories of our taxonomy still do not have generally accepted, consensus definitions and criteria. With the taxonomy of our area still in such flux, I am inclined to provisionally accept some infraspecific taxa (or at least mention their alleged characters in the discussion under a species) so that they are not "lost in the shuffle."

The problem of the infraspecific categories variety and subspecies is a vexing one. A recent study of current practice in the use of various infraspecific categories showed that the usage of variety and subspecies was profoundly muddled, with regional traditions as important as taxonomic philosophy in determining usage (Hamilton & Reichard 1992). Anderson, Crum, & Buck (1990), in a recent checklist of North American mosses, concluded "we have been unwilling to list both subspecies and varieties because the differences between them are not clear to us. As far as we can judge, a subspecies and a variety are the same thing. The varietal designation has long been used in botany, more specifically in bryology, and we see no particular gain, at least at this stage of our knowledge, in attempting to erect more than the single infraspecific category, variety". Holmgren (1994) has also presented a strong argument for use of the varietal rank. The International Code of Botanical Nomenclature provides a strong basis for the use of "variety" as the primary taxonomic level below species, and "subspecies" only when an additional intervening level is desired. "4.1. The secondary ranks of taxa in descending sequence are tribe (tribus) between family and genus, section (sectio) and series (series) between genus and species, and variety (varietas) and form (forma) below species. 4.2. If a greater number of ranks of taxa is desired, the terms for these are made by adding the prefix "sub-" to the terms denoting the principal or secondary ranks. A plant may thus be assigned to taxa of the following ranks (in descending sequence): regnum, subregnum, divisio or phylum, subdivisio or subphylum, classis, subclassis, ordo, subordo, familia, subfamilia, tribus, subtribus, genus, subgenus, sectio, subsectio, series, subseries, species, subspecies, varietas, subvarietas, forma, subforma" (Greuter et al. 2000).

While I strongly agree with this sentiment, standardizing all infraspecific taxa recognized in our area to either variety or subspecies would involve hundreds of new combinations; such proliferation of combinations (not based on new knowledge of the taxa) seems undesirable, though such an approach was taken by Dorn (1988) in the considerably smaller flora of Wyoming. For now, I am primarily using variety where choices exist, but accepting subspecies where an equivalent varietal name does not exist. Occasionally (following recent monographers), I have accepted subspecies as an infraspecific category indicating a more distinctive taxon than variety. This is not a happy solution, since it means that the categories of subspecies and variety are not used consistently to indicate a different level of taxonomic distinction. I have been disinclined to use quadrinomials, as, for instance,

Chamaecrista nictitans (Linnaeus) Moench ssp. *nictitans* var. *aspera* (Muhlenberg ex Elliott) Irwin & Barneby, because they generally strike me as unwieldy, impractical, and unnecessarily confusing, without providing sufficient compensating benefits (our state of knowledge rarely warranting or supporting such finely distinguished classifications of relationships).

In general, the user or reader will find the following general differences in taxonomic treatment, as compared to other floristic treatments of the area, such as Radford, Ahles, & Bell (RAB), Fernald (F), Gleason and Cronquist, 1st and 2nd editions (G, C), Small (S), Godfrey & Wooten (GW), the treatments so far published as part of the vascular flora of the southeastern states (SE), Kartesz (K), Wofford (W), and Harvill et al. (H). Family level taxonomy generally follows Cronquist's recent work (reflected in C and K), with a few groups split more finely; this represents a generally somewhat finer splitting than RAB, F, G, GW, W, and H, substantially coarser than S. Generic level taxonomy has for the last several decades been generally headed towards finer divisions; this treatment reflects that trend, with genera split somewhat more than RAB, F, G, W, and H, about the same as C, GW, K, and SE, and more coarsely than S. It is interesting to note, though, that our generic concepts are now perhaps more than halfway back to Small and Rydberg! At the species level, the treatment is about equivalent to C, K, and SE, slightly more finely split than F and G, substantially more finely split than RAB, GW, H, and W, and substantially coarser than S. Intraspecific taxa are recognized much more frequently than RAB, H, and W, somewhat more frequently than GW, about the same as C, G, K, SE, and much less frequently than F (probably less than half of Fernaldian varieties are recognized at any level). S did not use varieties (except very exceptionally); many taxa recognized by S as species are here regarded as varieties, or not recognized at all. Overall and on average, substantially more taxa are recognized than are by RAB and H, slightly more than by C, G, GW, W, about the same as K and SE, and substantially fewer than by F or S.

The *Flora* is being prepared as time allows. Drafts of family and genus treatments are being made available to interested botanists for use and field-testing. Some treatments must be considered tentative until further testing in the field and herbarium can be accomplished. All treatments should be considered as works in progress at this time, likely to change slightly or greatly before publication. For some species, determination of the distributions, habitats, and phenology requires additional herbarium and field work, not yet completed. I welcome suggestions on format and content.

Progress (as of March 17, 2004)

Working drafts now completed of: 191 families, 1226 genera, 4531 species or infraspecific taxa.
Estimated totals in 1° and 2° flora area: 232 families, 1313 genera, 5700 species or infraspecific taxa.
Percentage complete: families (82.9 %), genera (93.6 %), species (79.6 %).

Contents (as of March 17, 2004)

Genus name in ***bold italics*** = working draft completed
Family name in **bold** = working draft completed
Genus or family name in regular type = working draft not yet completed

[in brackets are the number of genera with completed drafts, and the number of species or infraspecific taxa]

FERNS AND FERN ALLIES

Aspidiaceae: [see Dryopteridaceae, Thelypteridaceae]

Aspleniaceae [2: 17]: ***Asplenium*** [15], ***Phyllitis*** [2].

Azollaceae [1: 2]: ***Azolla*** [2].

Blechnaceae [2: 3]: ***Blechnum*** [1], ***Woodwardia*** [2].

Dennstaedtiaceae [2: 3]: ***Dennstaedtia*** [1], ***Pteridium*** [2].

Dryopteridaceae [12: 30]: ***Arachniodes*** [1], ***Athyrium*** [2], ***Cyrtomium*** [2], ***Cystopteris*** [5], ***Deparia*** [2], ***Diplazium*** [1], ***Dryopteris*** [9], ***Gymnocarpium*** [2], ***Matteuccia*** [1], ***Onoclea*** [1], ***Polystichum*** [1], ***Woodsia*** [3].

Equisetaceae [1: 5]: ***Equisetum*** [5].

Grammitidaceae [1: 1]: ***Micropolypodium*** [1].

Hymenophyllaceae [2: 5]: ***Hymenophyllum*** [2], ***Trichomanes*** [3].

Isoetaceae: Isoetes (in progress).

Lycopodiaceae [8: 18]: ***Dendrolycopodium*** [3], ***Diphasiastrum*** [2], ***Huperzia*** [4], ***Lycopodiella*** [4], ***Lycopodium*** [2], ***Palhinhaea*** [1], ***Pseudolycopodiella*** [1], ***Spinulum*** [1].

Lygodiaceae [1: 2]: ***Lygodium*** [2].

Marsileaceae [2: 3]: ***Marsilea*** [2], ***Pilularia*** [1].

Ophioglossaceae [2: 17]: ***Botrychium*** [11], ***Ophioglossum*** [6].

Osmundaceae [1: 4]: ***Osmunda*** [4].

Polypodiaceae [3: 5]: ***Phlebodium*** [1], ***Pleopeltis*** [1], ***Polypodium*** [3].

Psilotaceae [1: 1]: ***Psilotum*** [1].

Pteridaceae [7: 19]: ***Adiantum*** [4], ***Argyrochosma*** [1], ***Astrolepis*** [2], ***Cheilanthes*** [5], ***Cryptogramma*** [1], ***Pellaea*** [4], ***Pteris*** [2]. [and also see Dennstaedtiaceae]

Salviniaceae [1: 2]: ***Salvinia*** [2].

Schizaeaceae [1: 1]: ***Schizaea*** [1]. [and also see Lygodiaceae]

Selaginellaceae [1: 8]: ***Selaginella*** [8].

Thelypteridaceae [3: 10]: ***Macrothelypteris*** [1], ***Phegopteris*** [2], ***Thelypteris*** [7].

Vittariaceae [1: 2]: ***Vittaria*** [2].

GYMNOSPERMS

Cupressaceae [6: 9]: ***Chamaecyparis*** [1], ***Cunninghamia*** [1], ***Juniperus*** [3], ***Platycladus*** [1], ***Taxodium*** [2], ***Thuja*** [1].

Ginkgoaceae [1: 1]: ***Ginkgo*** [1].

Pinaceae [6: 24]: ***Abies*** [2], ***Cedrus*** [1], ***Larix*** [1], ***Picea*** [3], ***Pinus*** [15], ***Tsuga*** [2].

Taxaceae [2: 2]: ***Taxus*** [1], ***Torreya*** [1].

Taxodiaceae: [see Cupressaceae]

Zamiaceae [1: 1]: ***Zamia*** [1].

DICOTYLEDONS

Acanthaceae [9: 22]: ***Dicliptera*** [1], ***Dyschoriste*** [2], ***Elytraria*** [1], ***Hygrophila*** [2], ***Justicia*** [5], ***Pseuderanthemum*** [1], ***Ruellia*** [8], ***Stenandrium*** [1], ***Yeatesia*** [1].

Aceraceae [1: 13]: ***Acer*** [13].

Actinidiaceae: Actinidia.

Adoxaceae [1: 4]: ***Sambucus*** [4], *Viburnum* (in progress).

Aizoaceae [3: 4]: ***Sesuvium*** [2], ***Tetragonia*** [1], ***Trianthema*** [1]. [also see Molluginaceae]

Altingiaceae [1: 1]: *Liquidambar* [1].

Amaranthaceae [7: 11]: *Achyranthes* [1], *Alternanthera* [3], *Amaranthus* (in progress), *Celosia* [2], *Froelichia* [2], *Gomphrena* [1], *Guilleminea* [1], *Iresine* [1].

Anacardiaceae [3: 13]: *Cotinus* [2], *Rhus* [6], *Toxicodendron* [5].

Annonaceae [1: 7]: *Asimina* [7].

Apiaceae [46: 102]: *Aegopodium* [1], *Aethusa* [1], *Ammi* [2], *Ammoselinum* [2], *Anethum* [1], *Angelica* [3], *Anthriscus* [3], *Apium* [2], *Bupleurum* [2], *Carum* [1], *Centella* [1], *Chaerophyllum* [4], *Ciclospermum* [1], *Cicuta* [4], *Conioselinum* [1], *Conium* [1], *Coriandrum* [1], *Cryptotaenia* [1], *Daucus* [2], *Erigenia* [1], *Eryngium* [10], *Falcaria* [1], *Foeniculum* [1], *Heracleum* [1], *Hydrocotyle* [8], *Levisticum* [1], *Ligusticum* [1], *Lilaeopsis* [2], *Osmorhiza* [2], *Oxypolis* [4], *Pastinaca*, *Perideridia* [1], *Petroselinum* [1], *Peucedanum* [1], *Pimpinella* [1], *Polytaenia* [1], *Pseudotaenia* [1], *Ptilimnium* [6], *Sanicula* [7], *Scandix* [1], *Sium* [1], *Spermolepis* [3], *Taenidia* [1], *Thaspium* [4], *Torilis* [3], *Trepocarpus* [1], *Zizia* [3].

Apocynaceae [11: 47]: *Amsonia* [6], *Angadenia* [1], *Apocynum*, *Asclepias* [25], *Catharanthus* [1], *Cynanchum* [3], *Gonolobus* [2], *Matelea* [4], *Nerium* [1], *Periploca* [1], *Trachelospermum* [1], *Vinca*, [2].

Aquifoliaceae [1: 18]: *Ilex* [18].

Araliaceae [4: 10]: *Aralia* [4], *Eleutherococcus* [1], *Hedera* [3], *Panax* [2].

Aristolochiaceae [3: 17]: *Aristolochia* [4], *Asarum* [3], *Hexastylis* [10].

Asclepiadaceae: [see Apocynaceae]

Asteraceae [123: 470]: *Acanthospermum* [3], *Achillea* (in progress), *Acmella* [2], *Ageratina* [5], *Ageratum* [2], *Ambrosia* (in progress), *Ampelaster* [1], *Amphiachyris* [1], *Anaphalis* [1], *Antennaria* [9], *Anthemis* [4], *Arctium* (in progress), *Arnica* [1], *Arnoglossum* [6], *Artemisia* [11], *Aster* (in progress), *Astranthium* [1], *Baccharis* [3], *Balduina* [3], *Balsamita* [1], *Bellis* [1], *Berlandiera* [1], *Bidens* (in progress), *Bigelovia* [2], *Boltonia* [4], *Borrchia* [2], *Brickellia* [2], *Brintonia* [1], *Calyptocarpus* [1], *Carduus* [3], *Carphephorus* [5], *Centaurea* [9], *Chamaemelum* [2], *Chaptalia* [1], *Chondrilla* [1], *Chrysanthemum* [1], *Chrysogonum* [3], *Chrysoma* [1], *Chrysopsis* [5], *Cichorium* [1], *Cirsium* [14], *Cnicus* [1], *Cniza* [4], *Coreopsis* [20], *Cosmos* [2], *Crepis* [4], *Croptilon* [1], *Dendranthema* [1], *Doellingeria* [3], *Dracopis* [1], *Echinacea* [5], *Echnops* [1], *Eclipta* [1], *Elephantopus* [4], *Emilia* [1], *Erechtites* [2], *Erigeron* [10], *Eupatoriadelphus* [5], *Eupatorium* [29], *Eurybia* [16], *Euthamia* [5], *Facelis* [1], *Filago* [3], *Fleischmannia* [1], *Gaillardia* [3], *Galinsoga* [2], *Gamochaeta* [4], *Gnaphalium* [1], *Grindelia* [2], *Guizotia* [1], *Gymnostyles* [1], *Hartwrightia* [1], *Hasteola* [1], *Helenium* [7], *Helianthus* [30], *Heliopsis* [3], *Heterotheca* [3], *Hieracium* [13], *Hymenopappus* [1], *Hypochaeris* [4], *Inula* [1], *Ionactis* [1], *Iva* [6], *Ixeris* [1], *Krigia* [5], *Lactuca* (in progress), *Lapsana* [1], *Leontodon* [2], *Leucanthemum* [2], *Liatris* (in progress), *Lygodesmia* [1], *Madia* [1], *Marshallia* [7], *Matricaria* [2], *Melanthera* [1], *Mikania* [1], *Oclemena* [2], *Oligoneuron* [3], *Onopordum* [1], *Packera* [10], *Palafoxia* [1], *Parthenium* [5], *Petasites* [1], *Picris* [2], *Pityopsis* [8], *Pluchea* [6], *Polymnia* [2], *Prenanthes* [10], *Pseudognaphalium* [5], *Pterocaulon* [1], *Pyrrhopappus* [1], *Ratibida* [2], *Rudbeckia* (in progress), *Rugelia* [1], *Santolina* [1], *Sclerolepis* [1], *Senecio* [1], *Sericocarpus* [3], *Silphium* (in progress), *Silybum* [1], *Smallanthus* [1], *Solidago* (in progress), *Soliva* [1], *Sonchus* (in progress), *Stokesia* [1], *Symphytotrichum* (in progress), *Tagetes* [3], *Tanacetum* [2], *Taraxacum* (in progress), *Tetragonotheca* [1], *Tragopogon* [3], *Tussilago* [1], *Verbesina* [7], *Vernonia* (in progress), *Xanthium* (in progress), *Youngia* [1], *Zinnia* [2].

Aucubaceae: [see Garryaceae]

Balsaminaceae [1: 3]: *Impatiens* [3].

Bataceae [1: 1]: *Batis* [1].

Begoniaceae [1: 1]: *Begonia* [1].

Berberidaceae [7: 11]: *Berberis* [3], *Caulophyllum* [2], *Diphylleia* [1], *Jeffersonia* [1], *Mahonia* [2], *Nandina* [1], *Podophyllum* [1].

Betulaceae [5: 19]: *Alnus* [6], *Betula* [8], *Carpinus* [2], *Corylus* [2], *Ostrya* [1].

Bignoniaceae [4: 5]: *Bignonia* [1], *Campsis* [1], *Catalpa* [2], *Macfadyena* [1].

Boraginaceae [15: 37]: *Amsinckia* [1], *Anchusa* [1], *Borago* [1], *Buglossoides* [1], *Cynoglossum* [3], *Echium* [2], *Hackelia* [1], *Heliotropium* [5], *Lappula* [1], *Lithospermum* [4], *Mertensia* [1], *Myosotis* [8], *Onosmodium* [5], *Plagiobothrys* [1], *Symphytum* [2].

Brassicaceae [48: 115]: *Alliaria* [1], *Allysum* [1], *Arabidopsis* [2], *Arabis* [10], *Armoracia* [1], *Barbarea* [2], *Berteroa* [1], *Boechera* (in progress), *Brassica* [4], *Braya* [1], *Bunias* [2], *Cakile* [3], *Calepina* [1], *Camelina* [2], *Capsella* [1], *Cardamine* [18], *Chorisporea* [1], *Cleome* [2], *Coincya* [1], *Conringia* [1], *Descurainia* [3], *Diplotaxis* [3], *Draba* [6], *Eruca* [1], *Erucastrum* [1], *Erysimum* [3], *Hesperis* [1], *Iberis* [1], *Isatis* [1], *Leavenworthia* [10], *Lepidium* (in progress), *Lobularia* [1], *Lunaria* [1], *Matthiola* [1], *Microthlaspi* [1], *Moricandia* [1], *Nasturtium* [2], *Neobeckia* [1], *Paysonia* [5], *Physaria* [2], *Polanisia* [3], *Raphanus* [2], *Rapistrum* [1], *Rorippa* (in progress), *Sinapis* [2], *Sibara* [1], *Sisymbrium* [2], *Teesdalia* [1], *Thlaspi* [2], *Turritis* [1], *Warea* [1].

Buddlejaceae: [see Scrophulariaceae].

Buxaceae [2: 3]: *Buxus* [1], *Pachysandra* [2].

Cabombaceae [2: 2]: *Brasenia* [1], *Cabomba* [1].

Cactaceae [1: 6]: *Opuntia* [6].

Caesalpiniaceae: [see Fabaceae].

Callitricheae: *Callitriche* (in progress).

Calycanthaceae [1: 2]: *Calycanthus* [2].

Calyceraceae [1: 1]: *Acicarpa* [1].

Campanulaceae [5: 10]: *Campanula* [6], *Campanulastrum* [1], *Jasione* [1], *Lobelia* (in progress), *Platycodon* [1], *Triodanis* (in progress), *Wahlenbergia* [1].

Cannabaceae [3: 8]: *Cannabis* [1], *Celtis* [3], *Humulus* [4].

Capparaceae: [see Cleomaceae]

Caprifoliaceae [2: 7]: *Lonicera* (in progress), *Symphoricarpos* [3], *Triosteum* [4]. [also see Adoxaceae, Diervillaceae, Linnaeaceae]

Caryophyllaceae [24: 81]: *Agrostemma* [1], *Arenaria* [3], *Cerastium* [10], *Dianthus* [3], *Drymaria* [1], *Holosteum* [1], *Honckenya* [1], *Lychnis* [1], *Minuartia* [8], *Moehringia* [1], *Moenchia* [1], *Myosoton* [1], *Paronychia* [11], *Petrorhagia* [1], *Polycarpon* [1], *Sagina* [2], *Saponaria* [1], *Scleranthus* [1], *Silene* [16], *Spergula* [3], *Spergularia* [2], *Stellaria* [9], *Stipulicda* [1], *Vaccaria* [1].

Casuarinaceae [1: 1]: *Casuarina* [1].

Celastraceae [4: 13]: *Celastrus* [2], *Crossopetalum* [1], *Euonymus* [9], *Paxistima* [1].

Celtidaceae: [see Cannabaceae]

Ceratophyllaceae [1: 3]: *Ceratophyllum* [3].

Chenopodiaceae [9: 16]: *Atriplex* [4], *Bassia* [2], *Beta* [1], *Chenopodium* (in progress), *Cycloloma* [1], *Salicornia* [2], *Salsola* [2], *Sarcocornia* [1], *Spinacia* [1], *Suaeda* [2].

Chrysobalanaceae [1: 1]: *Licania* [1].

Cistaceae [3: 21]: *Crocantemum* [8], *Hudsonia* [3], *Lechea* [10].

Cleomaceae [2: 5]: *Cleome* [2], *Polanisia* [3].

Clethraceae [1: 2]: *Clethra* [2].

Clusiaceae: [see Hypericaceae]

Compositae: [see Asteraceae]

Convolvulaceae [7: 27]: *Calystegia* (in progress), *Convolvulus* [1], *Cuscuta* (in progress), *Dichondra* [1], *Evolvulus* [2], *Ipomoea* [16], *Jacquemontia* [1], *Merremia* [1], *Stylisma* [5].

Cornaceae: *Cornus* (in progress).

Crassulaceae [5: 19]: *Crassula* [2], *Diamorpha* [1], *Hylotelephium* [3], *Rhodiola* [1], *Sedum* [12]. [and also see Penthoraceae]

Cucurbitaceae [9: 13]: *Cayaponia* [1], *Citrullus* [1], *Cucumis* [2], *Cucurbita* [3], *Echinocystis* [1], *Lagenaria* [1], *Luffa* [2], *Melothria* [1], *Sicyos* [1].

Cuscutaceae: [see Convolvulaceae]

Cyrtillaceae [2: 3]: *Cliftonia* [1], *Cyrilla* [2].

Diapensiaceae [3: 5]: *Galax* [1], *Pyxidantha* [2], *Shortia* [2].

Diervillaceae [2, 4]: *Diervilla* [3], *Weigela* [1].

Dionaeaceae [1: 1]: [see Droseraceae].

Dipsacaceae [2: 4]: *Dipsacus* [3], *Knautia* [1].

Droseraceae [1: 6]: *Dionaea* [1], *Drosera* [6].

Ebenaceae [1: 1]: *Diospyros* [1].

Elaeagnaceae [1: 4]: *Elaeagnus* [4].

Elatinaceae [1: 4]: *Elatine* [4].

Empetraceae: [see Ericaceae]

Ericaceae [28: 96]: *Agarista* [1], *Andromeda* [1], *Arctostaphylos* [1], *Bejaria* [1], *Calluna* [1], *Ceratiola* [1], *Chamaedaphne* [1], *Chimaphila* [2], *Elliottia* [1], *Epigaea* [1], *Erica* [1], *Eubotrys* [2], *Gaultheria* [2], *Gaylussacia* [9], *Hypopitys* [1], *Kalmia* [6], *Leucothoe* [2], *Lyonia* [6], *Menziesia* [1], *Monotropa* [1], *Monotropis* [1], *Orthilia* [1], *Oxydendrum* [1], *Pieris* [3], *Pyrola* [3], *Rhododendron* [18], *Vaccinium* [26], *Zenobia* [1].

Euphorbiaceae [12: 59]: *Acalypha* [6], *Chamaesyce* [13], *Cnidocolus* [1], *Croton* [9], *Euphorbia* [20], *Manihot* [1], *Ricinus* [1], *Sebastiania* [1], *Stillingia* [2], *Tragia* [3], *Triadica* [1], *Vernicia* [1]. [and also see Phyllanthaceae]

Fabaceae [66: 261]: *Acacia* [1], *Aeschynomene* [5], *Albizia* [1], *Alysicarpus* [1], *Amorpha* [8], *Amphicarpaea* [2], *Apios* [2], *Arachis* [1], *Astragalus* [8], *Baptisia* [11], *Centrosema* [1], *Cercis* [1], *Chamaecrista* [5], *Cladrastis* [1], *Clitoria* [2], *Crotalaria* [10], *Cytisus* [1], *Dalea* [11], *Desmanthus* [1], *Desmodium* [26], *Dioclea* [1], *Erythrina* [1], *Galactia* [7], *Genista* [1], *Gleditsia* [2], *Glottidium* [1], *Glycine* [1], *Glycyrrhiza* [1], *Gymnocladus* [1], *Indigofera* [4], *Kummerowia* [2], *Lablab* [1], *Lathyrus* [10], *Lespedeza* [14], *Leucaena* [1], *Lotus* [3], *Lupinus* [4], *Macroptilium* [1], *Medicago* [7], *Melilotus* [4], *Mimosa* [3], *Mucuna* [1], *Orbexilum* [6], *Parkinsonia* [1], *Pediomelum* [2], *Phaseolus* [5], *Pisum* [1], *Pueraria* [1], *Rhynchosia* [6], *Robinia* [8], *Securigera* [1], *Senna* [6], *Sesbania* [2], *Sophora* [1], *Strophostyles* [3], *Stylosanthes* [1], *Tephrosia* [4], *Thermopsis* [3], *Trifolium* [23], *Trigonella* [1], *Ulex* [1], *Vicia* [20], *Vigna* [2], *Wisteria* [3], *Zornia* [1]. [and also see Krameriaceae]

Fagaceae [3: 45]: *Castanea* [4], *Fagus* [2], *Quercus* [39].

Fumariaceae [6: 11]: *Adlumia* [1], *Capnoides* [1], *Corydalis* [3], *Dicentra* [4], *Fumaria* [1], *Lamprocapnos* [1].

Garryaceae [1:1]: *Aucuba* [1].

Gelsemiaceae [1: 2]: *Gelsemium* [2].

Gentianaceae [8: 36]: *Bartonia* [3], *Centaurium* [3], *Frasera* [1], *Gentiana* [9], *Gentianella* [2], *Gentianopsis* [1], *Obolaria* [1], *Sabatia* [16]. [and also see Menyanthaceae]

Geraniaceae [2: 12]: *Erodium* [2], *Geranium* [10].

Grossulariaceae [1: 8]: *Ribes* [8].

Guttiferae: [see Hypericaceae]

Haloragaceae [2: 12]: *Myriophyllum* (in progress), *Proserpinaca* [4].

Hamamelidaceae [2: 3]: *Fothergilla* [2], *Hamamelis* [1]. [and also see Altingiaceae]

Hippocastanaceae: [see Sapindaceae]

Hydrangeaceae [4: 11]: *Decumaria* [1], *Deutzia* [1], *Hydrangea* [5], *Philadelphus* [4].

Hydrastidaceae [1: 1]: *Hydrastis* [1].

Hydroleaceae [1: 3]: *Hydrolea* [3].

Hydrophyllaceae [6: 19]: *Ellisia* [1], *Hydrophyllum* [5], *Nama* [1], *Nemophila* [1], *Phacelia* [8].

Hypericaceae [2: 42]: *Hypericum* [38], *Triadenum* [4].
Illiciaceae [1: 2]: *Illicium* [2].
Iteaceae [1: 1]: *Itea* [1].
Juglandaceae [2: 15]: *Carya* [13], *Juglans* [2].
Krameriaceae [1: 1]: *Krameria* [1].
 Labiatae: [see Lamiaceae]
Lamiaceae [44: 138]: *Agastache* [3], *Ajuga* [3], *Blephilia* [3], *Callicarpa* [2], *Clerodendrum* [3], *Clinopodium* [9], *Collinsonia* [4], *Conradina* [1], *Cunila* [1], *Dicerandra* [5], *Dracocephalum* [1], *Elsholtzia* [1], *Galeopsis* [3], *Glechoma* [1], *Hedeoma* [2], *Hyptis* [2], *Hyssopus* [1], *Lamiastrum* [1], *Lamium* [5], *Leonotis* [1], *Leonurus* [3], *Lycopus* [8], *Macbridea* [1], *Marrubium* [1], *Meehania* [1], *Melissa* [1], *Mentha* [9], *Monarda* [11], *Mosla* [1], *Nepeta* [1], *Ocimum* [1], *Origanum* [1], *Perilla* [2], *Physostegia* [4], *Prunella* [3], *Pycnanthemum* [18], *Rosmarinus* [1], *Salvia* [8], *Satureja* [1], *Scutellaria* (in progress), *Sideritis* [1], *Stachys* (in progress), *Synandra* [1], *Teucrium* (in progress), *Thymus* [1], *Trichostema* [5], *Vitex* [1].
Lardizabalaceae [1: 1]: *Akebia* [1].
Lauraceae [6: 10]: *Cinnamomum* [1], *Laurus* [1], *Lindera* [4], *Litsea* [1], *Persea* [2], *Sassafras* [1].
 Leguminosae: [see Fabaceae]
 Leitneriaceae: [see Simaroubaceae]
Lentibulariaceae [2: 19]: *Pinguicula* [3], *Utricularia* [16].
 Leonticaceae: [see Berberidaceae]
 Lepuropetalaceae: [see Parnassiaceae]
Limnanthaceae [1: 1]: *Floerkea* [1].
Linaceae [1: 9]: *Linum* [9].
Linnaeaceae [2: 2]: *Abelia* [1], *Linnaea* [1].
Loganiaceae [2: 5]: *Mitreola* [3], *Spigelia* [2]. [and also see Gelsemiaceae]
 Loranthaceae: [see Viscaceae]
Lythraceae [9: 14]: *Ammania* [2], *Cuphea* [2], *Decodon* [1], *Didiplis* [1], *Lagerstroemia* [1], *Lythrum* [4], *Punica* [1], *Rotala* [1], *Trapa* [1].
Magnoliaceae [2: 9]: *Liriodendron* [1], *Magnolia* [8].
Malvaceae [21: 41]: *Abelmoschus* [1], *Abutilon* [1], *Alcea* [1], *Althaea* [1], *Anoda* [1], *Callirhoe* [3], *Firmiana* [1], *Gossypium* [1], *Hibiscus* [8], *Iliamna* [2], *Kosteletzkya* [2], *Malva* [4], *Malvastrum* [1], *Malvaviscus* [1], *Melochia* [1], *Modiola* [1], *Napaea* [1], *Pavonia* [1], *Sida* [5], *Tilia* [3], *Triumfetta* [1].
Martyniaceae [1: 1]: *Proboscidea* [1].
Melastomataceae [1: 10]: *Rhexia* [10].
Meliaceae [1: 1]: *Melia* [1].
Menispermaceae [3: 3]: *Calyocarpum* [1], *Cocculus* [1], *Menispermum* [1].
Menyanthaceae [2: 4]: *Menyanthes* [1], *Nymphoides* [3].
 Mimosaceae: [see Fabaceae]
Molluginaceae [1: 1]: *ollugo* [1].
Moraceae [6: 8]: *Broussonetia* [1], *Cudrania* [1], *Fatoua* [1], *Ficus* [2], *Maclura* [1], *Morus* [2].
Myricaceae [3: 7]: *Comptonia* [1], *Morella* [5], *Myrica* [1].
 Nandinaceae: [see Berberidaceae]
Nelumbonaceae [1: 2]: *Nelumbo* [2].
Nyctaginaceae [2: 5]: *Boerhavia* [2], *Mirabilis* [3].
Nymphaeaceae [2: 8]: *Nuphar* [6], *Nymphaea* [2]. [and also see Nelumbonaceae]
Nyssaceae [1: 4]: *Nyssa* [4].
Oleaceae [7: 23]: *Chionanthus* [1], *Forestiera* [4], *Forsythia* [2], *Fraxinus* [6], *Ligustrum* [8], *Osmanthus* [1], *Syringa* [1].
Onagraceae [6: 73]: *Chamerion* [1], *Circaea* [3], *Epilobium* [6], *Gaura* [5], *Ludwigia* [28], *Oenothera* [30].
Orobanchaceae [13: 29]: *Agalinis* (in progress), *Aureolaria* [7], *Buchnera* [2], *Castilleja* [2], *Conopholis* [1], *Dasistoma* [1], *Epifagus* [1], *Macranthera* [1], *Melampyrum* [3], *Orobanche* [4], *Pedicularis* [3], *Schwalbea* [1], *Seymeria* [2], *Striga* [1].
 Oxalidaceae: *Oxalis* (in progress).
Paeoniaceae [1: 1]: *Paeonia* [1].
Papaveraceae [8: 14]: *Argemone* [2], *Chelidonium* [1], *Eschscholtzia* [1], *Glaucium* [1], *Macleaya* [1], *Papaver* [6], *Sanguinaria* [1], *Stylophorum* [1]. [and also see Fumariaceae]
Parnassiaceae [2: 5]: *Lepuropetalon* [1], *Parnassia* [4].
Passifloraceae [1: 3]: *Passiflora* [3].
Paulowniaceae [1: 1]: *Paulownia* [1].
Pedaliaceae [1: 1]: *Sesamum* [1].
Penthoraceae [1: 1]: *Penthorum* [1].
 Phymaceae [3: 6]: *Mazus* [2], *Mimulus* [3], *Phryma* [1].
Phyllanthaceae [1: 1]: *Phyllanthus* [3].
Phytolaccaceae [1: 2]: *Phytolacca* [2].
Piperaceae [1]: *Peperomia* [1].
Pittosporaceae [1: 1]: *Pittosporum* [1].
Plantaginaceae [23: 73]: *Amphianthus* [1], *Antirrhinum* [2], *Bacopa* [5], *Chaenorhinum* [1], *Chelone* [4], *Collinsia* [1], *Cymbalaria* [1], *Digitalis* [2], *Gratiola* [9], *Kickxia* [2], *Leucospora* [1], *Limnophila* [1], *Limosella* [1], *Linaria* [1], *Lindernia* [6], *Mecardonia* [1], *Micranthemum* [2], *Misopates* [1], *Nuttallanthus* [3], *Penstemon* [12], *Plantago* [13], *Scoparia* [2], *Veronica* (in progress), *Veronicastrum* [1]

Platanaceae [1: 1]: *Platanus* [1].
Plumbaginaceae [1: 1]: *Limonium* [1].
 Podophyllaceae: [see Berberidaceae]
Podostemaceae [1: 1]: *Podostemum* [1].
Polemoniaceae [3: 27]: *Ipomopsis* [1], *Phlox* [23], *Polemonium* [3].
Polygalaceae [1: 23]: *Polygala* [23].
 Polygonaceae [7: 19]: *Brunnichia* [1], *Eriogonum* [3], *Fagopyrum* [1], *Fallopia* [5], *Persicaria* (in progress), *Polygonella* [6],
Polygonum (in progress), *Reynoutria* [2], *Rheum* [1], *Rumex* (in progress).
 Portulacaceae [4: 18]: *Claytonia* [4], *Montia* (in progress), *Phemeranthus* (6), *Portulaca* [8], *Talinum* [1].
Primulaceae [7: 25]: *Anagallis* [3], *Dodecatheon* [2], *Glax* [1], *Hottonia* [1], *Lysimachia* [16], *Samolus* [1], *Trientalis* [1].
 Punicaceae: [see Lythraceae]
 Ranunculaceae [20: 90]: *Aconitum* [3], *Actaea* [5], *Adonis* [1], *Anemonella* [1], *Anemone* [10], *Aquilegia* [2], *Caltha* [1],
Clematis [17], *Consolida* [2], *Coptis* [1], *Delphinium* [5], *Enemion* [1], *Eranthis* [1], *Helleborus* [1], *Myosurus* [1],
Nigella [1], *Ranunculus* [26], *Thalictrum* [9], *Trautvetteria* [1], *Xanthorhiza* [1]. [and also see Hydrastidaceae]
Resedaceae [1: 5]: *Reseda* [5].
Rhamnaceae [6: 14]: *Berchemia* [1], *Ceanothus* [4], *Frangula* [2], *Hovenia* [1], *Rhamnus* [5], *Sageretia* [1].
Rhizophoraceae [1: 1]: *Rhizophora* [1].
 Rosaceae [26: 91]: *Agrimonia* [7], *Amelanchier* (in progress), *Aphanes* [1], *Argentina* [1], *Aronia* [3], *Aruncus* [3],
Chaenomeles [1], *Crataegus* (in progress), *Dalibarda* [1], *Duchesnea* [1], *Exochorda* [1], *Filipendula* [2], *Fragaria* (in
 progress), *Geum* [9], *Kerria* [1], *Malus* (in progress), *Neviusia* [1], *Physocarpus* [2], *Porteranthus* [2], *Potentilla* [10],
Prunus (in progress), *Pyracantha* (in progress), *Pyrus* [2], *Rhodotypos* [1], *Rosa*, *Rubus* [20], *Sanguisorba* [3],
Sibbaldiopsis [1], *Sorbaria* [1], *Sorbus* [2], *Spiraea* [11], *Stephanandra* [1], *Waldsteinia* [3]. [and also see
 Chrysobalanaceae]
 Rubiaceae [11: 48]: *Asperula* [1], *Cephalanthus* (in progress), *Cruciata* [1], *Diodia* (in progress), *Galium*, *Houstonia*, *Mitchella*
[1], *Mitracarpus* [1], *Oldenlandia* [3], *Paederia* (in progress), *Pentodon* [1], *Pinckneya* [1], *Richardia* [2], *Sherardia*
[1], *Spermacoce* (in progress), *Stenaria* [1].
Rutaceae [4: 6]: *Citrus* [1], *Ptelea* [2], *Ruta* [1], *Zanthoxylum* [2].
Salicaceae [2: 24]: *Populus*, *Salix*.
Santalaceae [4: 4]: *Buckleya* [1], *Comandra* [1], *Nestronia* [1], *Pyralia* [1].
Sapindaceae [4: 9]: *Aesculus* [6], *Cardiospermum* [1], *Koeleruteria* [1], *Sapindus* [1].
Sapotaceae [1: 5]: *Sideroxylon* [5].
Sarraceniaceae [1: 11]: *Sarracenia* [11].
Saururaceae [1: 1]: *Saururus* [1].
Saxifragaceae [8: 23]: *Astilbe* [2], *Boykinia* [1], *Chrysosplenium* [1], *Heuchera* [8], *Mitella* [1], *Saxifraga* [7], *Sullivantia* [1],
Tiarella [2]. [and also see Grossulariaceae, Hydrangeaceae, Iteaceae, Parnassiaceae, Penthoraceae]
Schisandraceae [1: 1]: *Schisandra* [1].
 Scrophulariaceae [2: 4]: *Buddleja* [2], *Scrophularia* [2], *Verbascum* (in progress). [and also see Orobanchaceae, Phrymaceae,
 and Plantaginaceae]
Simaroubaceae [2: 2]: *Ailanthus* [1], *Leitneria* [1].
 Solanaceae [10: 26]: *Calibrachoa* [1], *Capsicum* [1], *Datura* [4], *Lycium* [3], *Nicandra* [1], *Nicotiana* [2], *Nierembergia* [1],
Petunia [1], *Physalis* [11], *Salpichroa* [1], *Solanum* (in progress).
Sphenocleaceae [1: 1]: *Sphenoclea* [1].
Staphyleaceae [1: 1]: *Staphylea* [1].
Styracaceae [2: 8]: *Halesia* [5], *Styrax* [3].
Symplocaceae [1: 1]: *Symplocos* [1].
 Tamaricaceae: *Tamarix* (in progress).
Tetrachondraceae [1: 1]: *Polyprenum* [1].
Theaceae [4: 6]: *Camellia* [2], *Franklinia* [1], *Gordonia* [1], *Stewartia* [2].
Thymelaeaceae [1: 1]: *Dirca* [1].
 Trapaceae: [see Lythraceae]
Tropaeolaceae [1: 1]: *Tropaeolum* [1].
Turneraceae [1: 1]: *Piriqueta* [1].
Ulmaceae [2: 10]: *Planera* [1], *Ulmus* [9]. [also see Celtidaceae]
 Umbelliferae: See Apiaceae
Urticaceae [5: 14]: *Boehmeria* [2], *Laportea* [1], *Parietaria* [4], *Pilea* [3], *Urtica* [4].
Valerianaceae [2: 5]: *Valeriana* [2], *Valerianella* [3].
 Verbenaceae [3: 6]: *Glandularia* [3], *Lantana* (in progress), *Phyla* [2], *Stylodon* [1], *Verbena* (in progress). [and also see
 Lamiaceae, Phrymaceae]
Violaceae [2: 39]: *Hybanthus* [2], *Viola* [40].
Viscaceae [1: 1]: *Phoradendron* [1].
Vitaceae [4: 17]: *Ampelopsis*, *Cissus*, *Parthenocissus*, *Vitis*.
Zygophyllaceae [2: 3]: *Kallstroemia* [1], *Tribulus* [2].

MONOCOTYLEDONS

Acoraceae [1: 2]: *Acorus* [2].
Agavaceae [4: 10]: *Camassia* [1], *Manfreda* [1], *Schoenolirion* [3], *Yucca* [5].

Alismataceae [3: 28]: *Alisma* [3], *Echinodorus* [4], *Sagittaria* [21].
Alliaceae [3: 18]: *Allium* [15], *Ipheion* [1], *Nothoscordum* [2].
Alstroemeriaceae [1: 1]: *Alstroemeria* [1].
Amaryllidaceae [8: 23]: *Crinum* [2], *Galanthus* [2], *Hymenocallis* [6], *Leucojum* [1], *Lycoris* [1], *Narcissus* [6], *Sternbergia* [1], *Zephyranthes* [4].
Araceae [10: 15]: *Arisaema* [5], *Arum* [1], *Calla* [1], *Colocasia* [1], *Orontium* [1], *Peltandra* [2], *Pinellia* [1], *Pistia* [1], *Symplocarpus* [1], *Xanthosoma* [1]. [and also see Acoraceae]
Arecaceae [4: 5]: *Butia* [1], *Rhapidophyllum* [1], *Sabal* [2], *Serenoa* [1].
Asparagaceae [1: 1]: *Asparagus* [1].
Bromeliaceae [1: 4]: *Tillandsia* [4].
Burmanniaceae [2: 3]: *Apteria* [1], *Burmannia* [2].
Cannaceae [1: 3]: *Canna* [3].
Colchicaceae [2: 7]: *Colchicum* [1], *Uvularia* [6].
Commelinaceae [4: 18]: *Commelina* [9], *Cuthbertia* [2], *Murdannia* [2], *Tradescantia* [5].
Convallariaceae: [see Ruscaceae].
Cymodoceaceae [2: 2]: *Halodule* [1], *Syringodium* [1].
Cyperaceae [17: 372]: *Bolboschoenus* [4], *Bulbostylis* [6], *Carex* (in progress), *Cladium* [2], *Cymophyllus* [1], *Cyperus* [59], *Dulichium* [1], *Eleocharis* (in progress), *Eriophorum* [4], *Fimbristylis* [13], *Fuirena* [4], *Isolepis* [2], *Kyllinga* [4], *Lipocarpa* [3], *Rhynchospora* [71], *Schoenoplectus* [12], *Scirpus* [11], *Scleria* [12], *Trichophorum* [2].
Dioscoreaceae [1: 5]: *Dioscorea* [5].
Eriocaulaceae [3: 12]: *Eriocaulon* (8), *Lachnocaulon* [3], *Syngonanthus* [1].
Gramineae: [see Poaceae]
Haemodoraceae [1: 1]: *Lachnanthes* [1].
Hemerocallidaceae [1: 2]: *Hemerocallis* [2].
Hostaceae [1: 3]: *Hosta* [3].
Hyacinthaceae [4: 8]: *Hyacinthoides* [2], *Hyacinthus* [1], *Muscari* [3], *Ornithogalum* [2].
Hydrocharitaceae [5: 7]: *Egeria* [1], *Elodea* [3], *Hydrilla* [1], *Limnobium* [1], *Vallisneria* [1].
Hypoxidaceae [1: 6]: *Hypoxis* [6].
Iridaceae [5: 15]: *Belamcanda* [1], *Calydorea* [1], *Crocus*, *Crocosmia* [1], *Gladiolus* (in progress), *Herbertia* (in progress), *Iris* (in progress), *Nemastylis* [1], *Sisyrinchium* [11].
Juncaceae [2: 45]: *Juncus* [38], *Luzula* [7].
Juncaginaceae [1: 1]: *Triglochin* [1].
Lemnaceae [5: 13]: *Landoltia* [1], *Lemna* [7], *Spirodela* [1], *Wolffia* [3], *Wolffiella* [1].
Liliaceae [8: 25]: *Clintonia* [2], *Erythronium* [6], *Lilium* [10], *Medeola* [1], *Prosartes* [2], *Streptopus* [2], *Tricyrtis* [1], *Tulipa* [1]. [and also see Agavaceae, Alliaceae, Amaryllidaceae, Asparagaceae, Colchicaceae, Hemerocallidaceae, Hostaceae, Hyacinthaceae, Hypoxidaceae, Melanthiaceae, Nartheciaceae, Ruscaceae, Smilacaceae, Themidaceae, Tofieldiaceae, Trilliaceae] – for disposition of genera in the formerly very broadly interpreted Liliaceae, see beginning of Liliaceae family treatment in the main text.
Marantaceae [1: 1]: *Thalia* [1].
Mayacaceae [1: 1]: *Mayaca* [1].
Melanthiaceae [10: 43]: *Amianthium* [1], *Anticlea* [1], *Chamaelirium* [1], *Helonias* [1], *Schoenocaulon* [1], *Stenanthium* [5], *Trillium* [26], *Veratrum* [5], *Xerophyllum* [1], *Zigadenus* [1].
Najadaceae [1: 5]: *Najas* [5].
Nartheciaceae [3: 7]: *Aletris* [4], *Lophiola* [1], *Narthecium* [2].
Nolinaceae: [see Ruscaceae]
Orchidaceae [25: 83]: *Aplectrum* [1], *Arethusa* [1], *Calopogon* [5], *Cleistes* [2], *Coeloglossum* [1], *Corallorrhiza* [6], *Cypripedium* [7], *Epidendrum* [1], *Epipactis* [1], *Galearis* [1], *Goodyera* [2], *Habenaria* [2], *Hexalectris* [1], *Isotria* [2], *Liparis* [2], *Listera* [3], *Malaxis* [4], *Platanthera* [17], *Pogonia* [1], *Ponthieva* [1], *Pteroglossaspis* [1], *Spiranthes* [18], *Tipularia* [1], *Triphora* [1], *Zeuxine* [1].
Poaceae [125: 477]: *Aegilops* [2], *Agrostis* [10], *Aira* [3], *Alopecurus* [4], *Ammophila* [1], *Amphicarpum* [2], *Andropogon* [19], *Anthenantia* [2], *Anthoxanthum* [2], *Apera* [1], *Aristida* [18], *Arrhenatherum* [2], *Arthraxon* [1], *Arundinaria* [2], *Arundo* [1], *Avena* [2], *Axonopus* [3], *Beckmannia* [1], *Bothriochloa* [4], *Bouteloua* [4], *Brachyelytrum* [2], *Briza* [1], *Bromus* [17], *Calamagrostis* [4], *Calamovilfa* [1], *Cenchrus* [5], *Chasmanthium* [4], *Chloris* [2], *Chrysopogon* [1], *Cinna* [2], *Coelorachis* [4], *Coix* [1], *Cortaderia* [1], *Corynephorus* [1], *Crypsis* (in progress), *Ctenium* [2], *Cynodon* [1], *Cynosurus* [2], *Dactylis* [1], *Dactyloctenium* [1], *Danthonia* [4], *Dasypyrum* [1], *Deschampsia* [2], *Desmazeria* [1], *Diarrhena* [2], *Dichanthelium* [53], *Digitaria* [10], *Dinebra* [1], *Distichlis* [1], *Echinochloa* [7], *Eleusine* [2], *Elymus* (in progress), *Elyonurus* [1], *Eragrostis* [26], *Eremochloa* [1], *Eriochloa* [2], *Eustachys* [3], *Festuca* [5], *Glyceria* [10], *Gymnopogon* [3], *Hackelochloa* [1], *Hainardia* [1], *Heteropogon* [1], *Hierochloa* [1], *Holcus* [2], *Hordeum* [4], *Imperata* [1], *Koeleria* [1], *Lagurus* [1], *Leersia* [4], *Leptochloa* [6], *Limnodea* [1], *Lolium* [3], *Luziola* [1], *Melica* [2], *Melinis* [1], *Microstegium* [1], *Milium* [1], *Miscanthus* [1], *Muhlenbergia* [15], *Neeragrostis* [1], *Oplismenus* [2], *Oryza* [1], *Oryzopsis* [1], *Panicum* [22], *Parapholis* [1], *Pascopyrum* [1], *Paspalum* (in progress), *Pennisetum*, *Phalaris* [5], *Phanopyrum* [1], *Phleum* [2], *Phragmites* [2], *Phyllostachys* [6], *Piptatherum* [2], *Piptochaetium* [1], *Poa* [17], *Polypogon* [3], *Pseudosasa* [1], *Puccinellia* [2], *Rostraria* [1], *Rottboellia* [1], *Saccharum* [6], *Sacciolepis* [2], *Schedonorus* [2], *Schizachne* [1], *Schizachyrium* [5], *Sclerochloa* [1], *Secale* [1], *Setaria* (in progress), *Sorghastrum* [4], *Sorghum* [3], *Spartina* [6], *Sphenopholis* [6], *Sporobolus* [15], *Steinchisma* [1], *Stenotaphrum* [1], *Thinopyrum* (in progress), *Torreyochloa* [2], *Tragus* [1], *Tridens* [5], *Triplasis* [2], *Tripsacum* [1], *Trisetum* [1], *Triticum* [1], *Uniola* [1], *Urochloa* [4], *Vulpia* [5], *Zea* [3], *Zizania* [1], *Zizaniopsis* [1], *Zoysia* (in progress).
Pontederiaceae [3: 7]: *Eichhornia* [1], *Heteranthera* [4], *Pontederia* [2].

Potamogetonaceae [2: 32]: *Potamogeton* [29], *Stuckenia* [3].
Ruppiaceae [1: 1]: *Ruppia* [1].
 Ruscaceae [4: 10]: *Convallaria* [2], Liriope (in progress), *Maianthemum* [4], *Nolina* [1], *Polygonatum* [3].
Scheuchzeriaceae [1:1]: *Scheuchzeria* [1].
Smilacaceae [1: 16]: *Smilax* [16].
 Sparganiaceae: [see Typhaceae]
Stemonaceae [1: 1]: *Croomia* [1].
Themidaceae [1: 1]: *Dichelostemma* [1],
 Tofieldiaceae [2: 4]: *Pleea* [1], *Tofieldia* [3].
Typhaceae [2: 8]: *Sparganium* [4], *Typha* [4].
 Uvulariaceae: [see Calochortaceae, Colchicaceae, Liliaceae].
Xyridaceae [1: 19]: *Xyris* [19].
Zannichelliaceae [1: 1]: *Zannichellia* [1].
Zosteraceae [1: 1]: *Zostera* [1]. [also see Cymodoceaceae]

Contributors

Richard J. LeBlond --
 Cyperaceae: *Rhynchospora*, *Scleria*.
 Melastomataceae.
 Poaceae: *Dichanthelium*, *Panicum*.
 Zack Murrell --
 Cornaceae.
 John B. Nelson --
 Lamiaceae: *Stachys*.
 Robert K. Peet --
 Juglandaceae: *Carya* (with A.S. Weakley).
 Milo Pyne --
 Solanaceae: *Physalis*.
 Bruce A. Sorrie --
 Asteraceae: *Pityopsis*.
 Cistaceae: *Lechea*.
 Cyperaceae: *Carex* (with T.F. Wieboldt and A.S. Weakley), *Eleocharis* (with A.S. Weakley).
 Gentianaceae: *Sabatia*.
 Haloragaceae: *Myriophyllum* (with A.S. Weakley).
 Lamiaceae: *Lycopus*.
 Violaceae: *Viola*.
 Brian van Eerden --
 Juncaceae: *Juncus*.
 Thomas F. Wieboldt --
 Cyperaceae: *Carex* (with A.S. Weakley and B.A. Sorrie).

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