
The Vascular Flora of the Red Hills Forever Wild Tract, Monroe County, Alabama

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Abstract

The Red Hills Forever Wild Tract (RHFWT) is a 1785 ha property that was acquired in two purchases by the State of Alabama Forever Wild Program in February and September 2010. The RHFWT is characterized by undulating terrain with steep slopes, loblolly pine plantations, and mixed hardwood floodplain forests. The property lies 125 km southwest of Montgomery, AL and is managed by the Alabama Department of Conservation and Natural Resources with an emphasis on recreational use and habitat management. An intensive floristic study of this area was conducted from January 2011 through June 2015. A total of 533 taxa (527 species) from 323 genera and 120 families were collected with 148 taxa being county records. Asteraceae was the most collected family with 71 species. Poaceae and Fabaceae were the next largest families with 48 and 45 species, respectively. *Quercus* was the largest genus, represented by 12 species and one named hybrid. Fifty-nine non-native species were collected during the surveys. Plant collections were deposited at the Alabama Natural Heritage Section Herbarium (ALNHS), with duplicates deposited at the Anniston Museum of Natural History Herbarium (AMAL), Jacksonville State University (JSU), and Auburn University Herbarium (AUA).

Introduction

The Forever Wild Program was established in 1992 by an Alabama constitutional amendment (Satterfield & Waddell 1993); the program was overwhelmingly reauthorized (75% of the popular vote) for an additional twenty years by a statewide referendum vote in 2012. The program

provides public lands for recreational use along with conservation of vital habitat. Since its inception, the Forever Wild Program, managed by the Alabama Department of Conservation and Natural Resources (AL-DCNR), has purchased approximately 97 500 ha (241 000 acres) of land for general recreation, nature preserves, additions to wildlife management areas and state parks. For each Forever Wild tract purchased, a management plan providing guidelines and recommendations for the tract must be in place within a year of acquisition. The 1785 ha (4412 acre) Red Hills Forever Wild Tract (RHFWT) was acquired in two separate purchases in February and September 2010, in part to provide protected habitat for the federally listed Red Hills Salamander (*Phaeognathus hubrichti* Highton). The two non-contiguous parcels, including one 16 ha (40 acre) outparcel near the northern portion, are separated by approximately 1.5 km (Fig. 1). This systematic inventory documents many plant species for the first time in the poorly surveyed flora of Monroe County.

Description of Study Area

The 1785 ha study site is located in rural, northern Monroe County, AL (31.733° – 31.801° N, 87.363° – 87.402° W) approximately 25 km north of Monroeville (Monroe County, AL) and 125 km southwest of Montgomery (Montgomery County, AL). Elevations on the tract range from approximately 30 m to 125 m above sea level. In 2012, Monroe County had an estimated population of 22,602 and total area of 2657 km², resulting in a relatively low population density of 9 people per km² (US Census Bureau 2014). The RHFWT lies within the Coastal Plain physiographic province and is positioned in the level IV ecoregion known as the Southern Hilly Gulf Coastal Plain

Table 1. Summary of vegetation surveys performed on the Red Hills Forever Wild Tract by Division, Class, Family, Genus, Total Taxa, Total Taxa Composition, Native Taxa, Non-native Taxa and Non-native Taxa Composition. (Nativity of species refers to North America.)

Division/Class	Families	Genera	Total Taxa	Total %Comp	Native	Non-native	Non-native %Comp
Lycopodiophyta	0	0	0	0.0	0	0	0.0
Monilophyta	12	18	20	4.0	17	3	0.5
Coniferophyta	2	2	6	1.0	6	0	0.0
Magnoliophyta	106	303	507	95.0	451	56	10.5
Class Liliopsida	19	59	112	21.0	96	19	3.5
Class Magnoliopsida	87	244	395	74.0	355	37	7.0
Total	120	323	533	100.0	474	59	11.0

(Griffith *et al.* 2001; NatureServe 2014). The natural vegetation of the RHFWT consists of a mixed oak/hickory/pine forest atop undulating terraces forming bluffs/ravines above moderate to low-gradient sandy bottomed drainages (Griffith *et al.* 2001). The Cretaceous to Tertiary-aged mixed clayey/loamy/sandy soils (US Department of Agriculture 2014) of the tract are characterized by upland dry oak/hickory/longleaf pine habitat, mixed hardwood floodplain forests, steep hardwood lined ravines, and planted monocultures of *Pinus taeda* L. (Loblolly Pine). The climate for the area averages a July and August high of 33 °C and a January low of 2 °C; rainfall for the area is approximately 131 cm (52 inches) per year with July typically being the wettest month and October being the driest. The number of frost-free days (growing season) averages 236 (The Weather Channel 2014). Before state acquisition, the land use for the impacted areas of the RHFWT was primarily long-term timber operations. Current estimations of area for the plant communities present on the RHFWT are approximately as follows: 60% Planted Loblolly Pine/Ruderal (monocultures of *Pinus taeda* L., pervaded with typical successional species including *Acer rubrum* L., *Ligustrum sinense* Lour., *Liquidambar styraciflua* L., *Rubus* spp., *Smilax* spp., etc.); 30% Upland Dry Hardwood/Longleaf Pine/Steep Ravines (comprised of *Carya* spp., *Illicium floridanum* Ellis, *Kalmia latifolia* L., *Quercus* spp., and *Pinus palustris* P. Mill.); 10% Bottomland/Mixed Floodplain Forest (generally comprised

of *Acer* spp., *Magnolia virginiana* L. var. *australis* Sarg., *Nyssa sylvatica* Marsh., *Quercus* spp.).

Methods

The systematic sampling of the RHFWT flora was conducted from January 2011 through June 2015. The study area was surveyed utilizing a modified meandering method similar to that of Goff *et al.* (1982). When possible, plants were collected in a non-destructive (top-snatched) manner. Voucher specimens were collected and identified by the authors. Verifications were subsequently made by Dan Spaulding, curator of collections at the Anniston Museum of Natural History and deposited at the Alabama Natural Heritage Section Herbarium (ALNHS). Duplicates were deposited at the Anniston Museum of Natural History Herbarium (AMAL), the Jacksonville State University Herbarium (JSU) and the Auburn University Herbarium (AUA). Plant identifications, comparison of related species, and state records were determined using the following: Alabama Plant Atlas (Kral *et al.* 2015); Flora of the Southern and Mid-Atlantic States (Weakley 2015); Guide to the Vascular Plants of the Florida Panhandle (Clewett 1985); Aquatic and Wetland Plants of the Southeastern United States. Dicotyledons (Godfrey & Wooten 1981); Aquatic and Wetland Plants of the Southeastern United States. Monocotyledons (Godfrey & Wooten 1979); Manual of the Grasses of the United States. Volumes I and II (Hitchcock 1971); Manual of the Vascular Flora of the Carolinas (Radford *et al.* 1968); and Plant Life of Alabama (Mohr 1901). Guidelines for construction of this flora followed recommendations outlined by Palmer *et al.* (1995). Placement of species at the family rank and binomials follow Weakley (2015). Abbreviations for authorities and nativity of species follow Kartesz (2015).

Results and Discussion

Vegetation survey summary

A total of 533 taxa representing 527 species were collected from the RHFWT. This represented 323 genera and 120 families with 148 taxa (28%) ascertained to be county records for Monroe County (Kartesz 2015). Asteraceae was the largest family with 71 species. Poaceae and Fabaceae were the next largest families with 48 and 45 species,

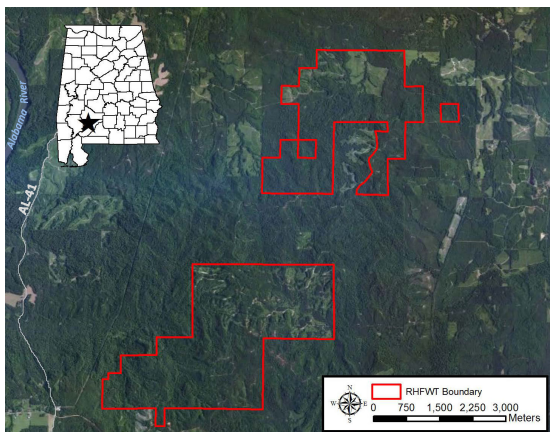


Figure 1. Location and surrounding land use of the Red Hills Forever Wild Tract in Monroe County, AL.

respectively. *Quercus* was the largest genus, represented by 12 species and one named hybrid. Flowering plants comprised 95% of the flora with dicots making up 74.0% and monocots 21.0% of the flora (Table 1). Ferns and fern allies followed with 4% and conifers comprised 1% of the total number of taxa sampled. Fifty-nine species, or 11% of the species composition, were introduced (non-native to North America) species.

Selected rare and notable plant species

Several notable rare, undercollected or regionally uncommon species were collected in the course of this study, including: *Hamamelis ovalis* S.W. Leonard (Bigleaf Witch-Hazel); *Tephrosia hispidula* (Michx.) Pers. (Sprawling Hoary-Pea); and *Dirca palustris* L. (Leatherwood)(Fig. 2).

Hamamelis ovalis

First described in 2006 (Leonard 2006) *Hamamelis ovalis* currently has a reported worldwide distribution from a total of six U.S. counties, one in Mississippi (Perry County) and five Alabama counties (Butler, Clarke, Covington, Crenshaw, and Monroe Counties) (Kartesz 2015; Kral *et al.* 2015). Bigleaf Witch-hazel can be distinguished from *Hamamelis virginiana* L. (Common Witch-hazel) by its larger, more rounded leaves (up to 24 cm long and 17 cm wide) that have densely stellate pubescence below, longer (up to 14 mm) reddish petals that may be yellow-tipped and its short-statured clonal nature. Also, the floral phenology is several weeks later for *Hamamelis ovalis*, occurring from late December through February. This rare (G1/S1 for Alabama and Mississippi) species (NatureServe 2014) grows in dry to mesic loamy soils of low slopes under mixed hardwood/pine canopies, often above shallow ravines.

Tephrosia hispidula

Though more common in the eastern portion of the southeastern US, *Tephrosia hispidula* is only documented from three Louisiana parishes, three Mississippi counties and, with this record, six Alabama counties (Kartesz 2015; Kral *et al.* 2015). Sprawling Hoary-Pea is a laxly erect, perennial herb of open pine/mixed woodlands that can reach 50 cm. The once-pinnately compound leaves arise from short stalks. Floral spikes appear from late May through early Fall and produce up to four yellowish-white flowers when freshly opened, turning reddish bronze with age; the fruit is hirsute and flattened (Isely 1990). This uncommon (G4) species is listed as an S2 species in Louisiana and S3 species in North Carolina, but it is not ranked elsewhere throughout its range (NatureServe 2014).

Dirca palustris

Dirca palustris is a small to medium-sized woody shrub uncommon to Alabama. Though more widespread in northern parts of the US, the present study site is nearing the known southern limits for this (G4) species (Kartesz 2015; Kral *et al.* 2015; NatureServe 2014). Commonly found in rich, mesic calcareous forests, the small flowers and nondescript leaves of leatherwood can be easily overlooked. Unique because of its highly flexible, jointed stems,

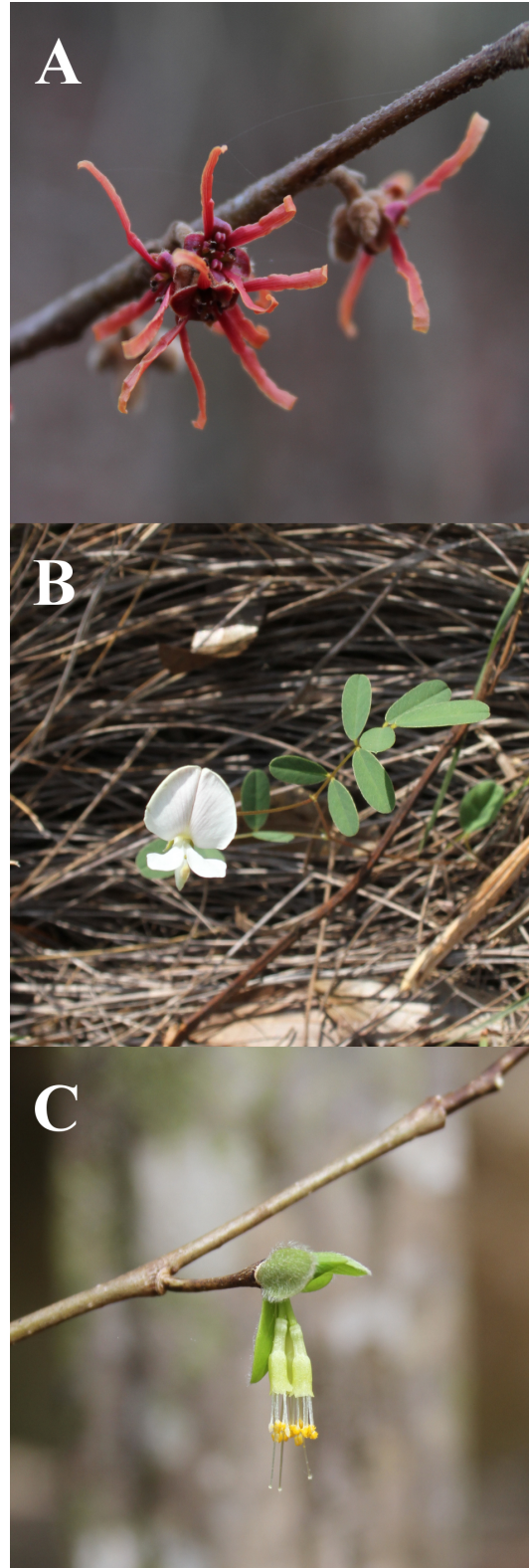


Figure 2. Notable plant species found on the Red Hills Forever Wild Tract. A) *Hamamelis ovalis*, B) *Tephrosia spicata*, and C) *Dirca palustris*. (Photos: T. W. Barger, Monroe Co., AL.)

Dirca palustris was used by Native Americans medicinally, as well as for basketry and tying objects.

Exotic plant species

Sixteen of the 59 non-native plant taxa collected were considered county records for Monroe County (Kartesz 2015). The total percentage of exotics collected (11%) during this study is comparable to other floras conducted on federally or state owned properties (Table 2) in Alabama: the 123 ha Shoal Creek Forever Wild Tract yielded 13% non-natives (Holt *et al.*, pers. comm.); the 1216 ha Old Cahawba Forever Wild Tract yielded 19% non-natives (Barger *et al.* 2014); the 7365 ha Perdido River Forever Wild Tract yielded 11% non-natives (Barger *et al.* 2013); the 240 ha Indian Mountain Forever Wild Tract yielded 11% non-natives (Barger & Holt 2010); the 130 ha Coon Creek Forever Wild Tract yielded 7% non-natives (Barger & Tenaglia 2008); the 2528 ha of Lake Guntersville State Park yielded 17% non-natives (Spaulding 1999); the Solon Dixon Center flora yielded 13% non-natives (Hansen *et al.* 2013); the 28 329 ha of Talladega Ranger District, Talladega National Forest yielded 12% non-natives (Ballard 1995); and the 1101 ha of Cheaha State Park yielded 10% non-natives (Bussey 1983). While this study did not focus on quantitative measurements of the exotic plant coverage, the observed land area covered by these non-native plants was restricted to primarily ruderal or disturbed areas of the tract. The most commonly encountered non-native plant species, in order of relative abundance, were: *Ligustrum sinense* (Chinese Privet), *Lonicera japonica* (Japanese Honeysuckle), *Albizia julibrissin* Durazz. (Silk tree), *Pueraria montana* (Lour.) Merr. var. *lobata* (Willd.) Maesen & S. Almeida (Kudzu), *Lygodium japonicum* (Thunb. ex Murr.) Sw. (Japanese Climbing Fern), and the combined *Medicago lupulina* L., *Melilotus albus* Medik., *Trifolium* spp. and *Vicia* spp. (Bur-clover, Sweet Clover, Clovers and Vetches, respectively).

Table 2. Percentage of exotic species from selected vascular floras conducted on state or federally owned land in Alabama. Study sites marked with an asterisk in the following table were conducted by the lead author.

Study Site	% Exotics
Coon Creek FW Tract*	7
Cheaha State Park	10
Indian Mtn. FW Tract*	11
Perdido FW Tract*	11
Red Hills FW Tract*	11
Talladega Ranger District	12
Shoal Creek FW Tract*	13
Solon Dixon Center	13
Guntersville State Park	17
Old Cahawba FW Tract*	19

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Appendix I. Annotated Checklist

Annotated checklist of the vascular flora of the Red Hills Forever Wild Tract, with breakdown of the survey by taxonomic level and nativity. Nomenclature follows Weakley (2015) and abbreviations for the authorities follow Kartesz (2015). The US Department of Agriculture's PLANTS database website (2014) was also referenced for additional synonyms and common names (for labels). Arrangement of the checklist is by division, then alphabetically by family, genus, and specific epithet. Species followed with a dagger (†) after the collection number are considered non-native species to the flora; those followed by an asterisk (*) are species of special concern or are considered state rare; and those followed by a double dagger (‡) were determined to be county records. Collection numbers listed are specific to the current flora and vouchered specimens are recorded in the follow format: *Hamamelis ovalis* S.W. Leonard RH001, *Asplenium platyneuron* (L.) B.S.P. RH476, etc.

MONIOPHYTA (Horsetails and Ferns)

ASPLENIACEAE – SPLEENWORT FAMILY
Asplenium platyneuron (L.) B.S.P. 476

ATHYRIACEAE – LADY FERN FAMILY
Athyrium asplenoides (Michx.) A.A. Eaton 177
Deparia petersenii (Kunze) M. Kato 403 †

BLECHNACEAE – CHAIN FERN FAMILY
Woodwardia areolata (L.) T. Moore 116

DENNSTAEDTIACEAE – BRACKEN FAMILY
Pteridium aquilinum (L.) Kuhn var. *pseudocaudatum* (Clute) Heller 072

DRYOPTERIDACEAE – WOOD FERN FAMILY
Polystichum acrostichoides (Michx.) Schott 020

LYGODIACEAE – CLIMBING FERN FAMILY
Lygodium japonicum (Thunb. ex Murr.) Sw. 214 †

ONOCLEACEAE – SENSITIVE FERN FAMILY
Onoclea sensibilis L. 056

OPHIOGLOSSACEAE – ADDER'S TONGUE FERN FAMILY
Botrypus virginianus (L.) Holub 058
Ophioglossum crotalophoroides Walt. 448
Sceptridium bitermum (Sav.) Lyon 221
Sceptridium dissectum (Spreng.) Lyon 040
Sceptridium lunarioides (Michx.) Holub 365

OSMUNDACEAE – ROYAL FERN FAMILY
Osmunda spectabilis Willd. 165
Osmundastrum cinnamomeum (L.) K. Presl 124

POLYPODIACEAE – POLYPODY FAMILY
Pleopeltis polypodioides (L.) Andrews & Windham 029

PTERIDACEAE – MAIDENHAIR FERN FAMILY
Adiantum capillus-veneris L. 423

THELYPTERIDACEAE – MARSH FERN FAMILY
Macrothelypteris torresiana (Gaud.) Ching 250 †
Phegopteris hexagonoptera (Michx.) Fée 059
Thelypteris kunthii (Desv.) Morton 251 †

CONIFEROPHYTA (Gymnosperms)

CUPRESSACEAE – CYPRESS FAMILY
Juniperus virginiana L. 053

PINACEAE – PINE FAMILY
Pinus echinata P. Mill. 341
Pinus glabra Walt. 026
Pinus palustris P. Mill. 285
Pinus taeda L. 047
Pinus virginiana P. Mill. 197 †

MAGNOLIOPHYTA (Flowering Plants)

ACANTHACEAE – ACANTHUS FAMILY
Ruellia caroliniensis (J.F. Gmel.) Steud. 236
Yeatesia viridiflora (Nees) Small 245

ADOXACEAE – MOSCHATTEL FAMILY
Sambucus canadensis L. 232
Viburnum acerifolium L. 110
Viburnum rufidulum Raf. 493
Viburnum scabrellum (Torr. & Gray) Chapman 507

AGAVACEAE – AGAVE FAMILY
Manfreda virginica (L.) Salisb. ex Rose 498 †
Yucca filamentosa L. 153
Yucca flaccida Haw. 015

ALLIACEAE – ONION FAMILY
Allium canadense L. var. *canadense* 097

ALTINGIACEAE – SWEET-GUM FAMILY
Liquidambar styraciflua L. 195

AMARYLLIDACEAE – AMARYLLIS FAMILY
Gladiolus ×gandavensis Van Houtte 518 † ‡
Hymenocallis occidentalis (Le Conte) Kunth 244 †
Leucojum aestivum L. 049 † ‡
Narcissus ×incomparabilis P. Mill. 446 †

ANACARDIACEAE – CASHEW FAMILY
Rhus copallinum L. 173
Rhus glabra L. 281

Toxicodendron pubescens P. Mill. 154
Toxicodendron radicans (L.) Kuntze 175

ANNONACEAE – CUSTARD-APPLE FAMILY
Asimina parviflora (Michx.) Dunal 038

APIACEAE – CARROT FAMILY
Angelica venenosa (Greenway) Fern. 346
Cryptotaenia canadensis (L.) DC. 249
Eryngium prostratum Nutt. ex DC. 338 ‡
Sanicula canadensis L. 246 ‡
Sanicula marilandica L. 477 ‡

APOCYNACEAE – DOGBANE FAMILY
Amsonia tabernaemontana Walt. 129
Asclepias amplexicaulis Sm. 517 ‡
Asclepias tuberosa L. 183 ‡
Asclepias variegata L. 181 ‡
Gonolobus suberosus (L.) R. Brown var. *suberosus* 264 ‡
Trachelospermum diffforme (Walt.) Gray 235 ‡

AQUIFOLIACEAE – HOLLY FAMILY
Ilex coriacea (Pursh) Chapman 461 ‡
Ilex longipes Chapman ex Trel. 100
Ilex opaca Ait. 024
Ilex vomitoria Ait. 463

ARACEAE – ARUM FAMILY
Arisaema dracontium (L.) Schott 094
Arisaema triphyllum (L.) Schott 060

ARALIACEAE – GINSENG FAMILY
Aralia spinosa L. 266
Hedera helix L. 050 † ‡

ARISTOLOCHIACEAE – BIRTHWORT FAMILY
Endodeca serpentaria (L.) Raf. 057
Hexastylis arifolia (Michx.) Small var. *arifolia* 457
Hexastylis arifolia (Michx.) Small var. *callifolia* (Small)
 Blomquist 023

ASTERACEAE – ASTER FAMILY
Ageratina aromatica (L.) Spach 429
Ambrosia artemisiifolia L. 317
Ambrosia trifida L. 325
Arnoglossum ovatum (Walt.) H.E. Robins.
 var. *ovatum* 295 ‡
Baccharis halimifolia L. 272
Bidens bipinnata L. 397
Boltonia diffusa Ell. 451 ‡
Brickellia eupatorioides (L.) Shinnars 431
Brintonia discoidea (Ell.) Greene 424
Chrysopsis hyssopifolia Nutt. 393 ‡
Cirsium horridulum Michx. 143 ‡
Conoclinium coelestinum (L.) DC. 428

Conyza bonariensis (L.) Cronq. 261 ‡
Coreopsis auriculata L. 159 ‡
Coreopsis major Walt. var. *rigida* (Nutt.) Boynt. 192
Coreopsis pubescens Ell. 439
Croptilon divaricatum (Nutt.) Raf. 426
Eclipta prostrata (L.) L. 330
Elephantopus carolinianus Raeusch. 402
Elephantopus tomentosus L. 334
Erechtites hieracifolius (L.) Raf. ex DC. 265
Erigeron strigosus Muhl. ex Willd. 191
Eupatorium capillifolium (Lam.) Small 287
Eupatorium compositifolium Walt. 432
Eupatorium hyssopifolium L. 427 ‡
Eupatorium perfoliatum L. 425 ‡
Eupatorium serotinum Michx. 494
Euthamia caroliniana (L.) Greene ex Porter & Britt. 414
Euthamia hirtipes (Fern.) Sieren 415 ‡
Gamochaeta purpurea (L.) Cabrera 084 ‡
Helenium amarum (Raf.) H. Rock 268
Helenium autumnale L. 318
Helenium flexuosum Raf. 199
Helianthus angustifolius L. 322
Helianthus divaricatus L. 194 ‡
Helianthus microcephalus Torr. & Gray 472 ‡
Helianthus resinosus Small 193
Heterotheca latifolia Buckl. var. *latifolia* 482 ‡
Hieracium gronovii L. 305
Hieracium marianum Willd. 367 ‡
Krigia biflora (Walt.) Blake 128 ‡
Krigia dandelion (L.) Nutt. 456 ‡
Krigia virginica (L.) Willd. 152 ‡
Lactuca canadensis L. 252 ‡
Lactuca floridana (L.) Gaertn. 383
Lactuca graminifolia Michx. 277 ‡
Liatris elegans (Walt.) Michx. 444
Liatris gracilis Pursh 378
Liatris spicata (L.) Willd. 304
Mikania scandens (L.) Willd. 349
Pityopsis aspera (Gray) Small var. *adenolepis* (Fern.)
 Semple & Bowers 353
Pluchea camphorata (L.) DC. 335
Prenanthes altissima L. 420
Pseudognaphalium helleri (Britt.) A. Anderb. 465 ‡
Pseudognaphalium obtusifolium (L.) Hilliard & Burt 409
Pyrrhopappus carolinianus (Walt.) DC. 279
Rudbeckia hirta L. 200
Sericocarpus asteroides (L.) B.S.P. 230
Silphium asteriscus L. var. *dentatum* (Ell.) Chapman 356
Solidago altissima L. 478
Solidago arguta Ait. 307 ‡
Solidago erecta Banks ex Pursh 321 ‡
Solidago flaccidifolia Small 406
Solidago odora Ait. 396

Symphyotrichum dumosum (L.) Nesom 413 ‡
Symphyotrichum patens (Ait.) Nesom 351 ‡
Symphyotrichum pilosum (Willd.) Nesom 499
Trilisa odoratissima (Walt. ex J.F. Gmel.) Cass. 362
Vernonia angustifolia Michx. 377 ‡
Vernonia gigantea (Walt.) Trel. ex Branner & Coville 255
Vernonia glauca (L.) Willd. 495

BERBERIDACEAE – BARBERRY FAMILY

Nandina domestica Thunb. 051 ‡
Podophyllum peltatum L. 061

BETULACEAE – BIRCH FAMILY

Alnus serrulata (Ait.) Willd. 164
Betula nigra L. 418
Carpinus caroliniana Walt. var. *caroliniana* 256
Ostrya virginiana (P. Mill.) K. Koch 044

BIGNONIACEAE – CROSSVINE FAMILY

Campsis radicans (L.) Seem. ex Bureau 223
Catalpa bignonioides Walt. 091

BORAGINACEAE – BORAGE FAMILY

Cynoglossum virginianum L. 063
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Lepidium virginicum L. 134 ‡

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Lobelia puberula Michx. var. *puberula* 417
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Tradescantia ohimensis Raf. 213 ‡
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Ipomoea hederacea Jacq. 481 ‡
Ipomoea pandurata (L.) G.F.W. Mey. 253
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Carex complanata Torr. & Hook. 529
Carex frankii Kunth 523
Carex glaucescens Ell. 360
Carex lurida Wahlenb. 180
Carex oxylepis Torr. & Hook. 531 ‡
Carex stipata Muhl. ex Willd. var. *stipata* 525 ‡
Carex tribuloides Wahlenb. 532 ‡
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Cyperus pseudovegetus Steud. 438
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Eleocharis tuberculosa (Michx.) Roemer & J.A. Schultes 436
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Rhynchospora chalarocephala Fern. & Gale 391 ‡
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Rhododendron arborescens (Pursh) Torr. 530 ‡

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Perilla frutescens (L.) Britt. 238 ‡

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(Torr.) LeBlond 437*Dichanthelium polyanthes* (J.A. Schultes) Mohl. 289 †*Dichanthelium scoparium* (Lam.) Gould 381*Digitaria ciliaris* (Retz.) Koel. 515 †*Digitaria violascens* Link 408 †*Elymus glabriflorus* (Vasey) Scribn. & Ball 468*Eragrostis hirsuta* (Michx.) Nees 358*Eragrostis spectabilis* (Pursh) Steud. 400*Erianthus alopecuroides* (L.) Ell. 203*Erianthus brevibarbis* Michx. 350 †*Erianthus giganteus* (Walt.) Beauv. 497*Festuca subverticillata* (Pers.) Alexeev 526 †*Imperata cylindrica* (L.) Beauv. 141 †*Leersia virginica* Willd. 443*Lolium perenne* L. var. *aristatum* Willd. 519 † ‡*Melica mutica* Walt. 111*Oplismenus setarius* (Lam.) Roemer & J.A. Schultes 215*Panicum verrucosum* Muhl. 442*Panicum virgatum* L. 227

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