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# A floristic survey of vascular plants of the Bronx River Parkway Reservation in Westchester, New York: Compilation 1973–1998<sup>1</sup>

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FRANKEL, E. (Professor Emeritus, Lehman College, City University of New York, Bronx, New York 10468-1589 and The New York Botanical Garden, Department of Continuing Education, Bronx, New York 10458-5126). A floristic survey of vascular plants of the Bronx River Parkway Reservation in Westchester, New York: Compilation 1973–1998. 126:359–366. 1999.—This study spans a period of 25 years, 1973–1998. It combines present data with findings reported in 1978 and 1979. Vascular plants growing along 10 miles of the Bronx River Parkway Reservation between Bronxville north to the Kensico Dam Plaza in Valhalla are recorded. Plants are categorized into five major groups: Vascular Cryptogams, Gymnosperms, Monocotyledons, Woody Dicotyledons and Herbaceous Dicotyledons. Reported are 128 families, 387 genera, and 785 species of which 279 or 35.5% are nonindigenous. This finding is 5.5% higher than the 30% alien species reported for New York State. Invasive aliens remain very constant; they represented 10.5% of the listed species in 1978 and 10.6% 20 years later. Moreover, 91.7% of these foreign invaders have been on the Reservation for at least 25 years. Nevertheless there is great concern regarding their presence; they tend to displace local flora, change ecosystems, upset biodiversity and need to be controlled.

Key words: Bronx River Parkway Reservation, 25 year study, vascular plants, nonindigenous species and non-indigenous invasive species.

For the past 25 years, vascular plants have been identified and recorded along 10 miles of the Bronx River Parkway Reservation from Bronxville north to the Kensico Dam in Valhalla in the County of Westchester, New York. The Reservation consists of the Bronx River, and the Bronx River Parkway flanked by a green belt.

The Reservation is the property of Westchester County and is maintained by the Department of Parks, Recreation and Conservation. The River and Parkway extend southward beyond the county line into the borough of Bronx, New York City. The River flows through The New York Botanical and Zoological Gardens and completes a 20 mile journey from source to mouth by emptying into the East River.

In 1990, the Reservation from Bronxville to the Kensico Dam Plaza was listed on the National Register of Historic Places as the largest intact portion of the original Reservation property. The construction of the Reservation, completed in 1925, transformed the River from an “open cesspool” to its original natural beauty,

created a Parkway that became the national model for similar projects, and reclaimed the boundaries of the Reservation by removing thousands of dead and diseased plants and replaced them with more than 150,000 native woody plants. The County plans to celebrate the 75th anniversary of the Reservation in 2000 in recognition of its contribution to conservation, recreation, transportation and scenic beauty.

The Bronxville-Valhalla tract which was studied embraces a variety of habitats and plant communities—meadows, lawns, virgin forests, river banks, flood plains, rocky slopes, paved and unpaved pedestrian paths, and disturbed areas.

This study is a compilation of floral data presented in two previously published reports (Frankel 1978; Frankel 1979) and additional findings gathered during the subsequent 20 years (1978–1998). The 1978 paper listed 104 families, 362 genera, and 663 species of which 222 or 33.5%, are nonindigenous. The 1979 supplementary article added four families, 18 genera and 71 species including nine or 12.7%, aliens. The total of the two studies for 1937 to 1978 is 108 families 380 genera and 734 species including 231, or 31.5, aliens.

The vascular flora in this presentation is categorized into five major groups: Vascular Cryptogams (Pteridophytes), Gymnosperms, Monocotyledons, and Woody and Herbaceous Dicotyledons. The families are arranged phylogenetically.

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Table 1. Numbers and percentages of families, genera, species, and alien and invasive species in five major groups of vascular plants along the Bronx River Parkway Reservation (1973–1998).

Major Groups	Families		Genera		Species		Aliens	
	No.	%	No.	%	No.	%	No.	%
Cryptogams	8	6.3	15	3.9	23	2.9	0	0
Gymnosperms	4	3.1	11	2.8	18	2.3	7	2.5
Monocotyledons	19	14.8	82	21.2	153	19.5	44	15.8
Dicotyledons								
Woody	45	35.2	93	24.0	180	23.0	66	23.7
Herbaceous	52	40.6	185	48.1	411	52.3	162	58.0
Totals	128	100.0	387	100.0	785	100.0	279	100.0

The family with the greatest number of species is the Asteraceae with 107 taxa representing 26.0% of the herbaceous dicotyledons; of these 28, or 26.2%, are aliens including 11, or 39.3%, invasives. The next largest family is the Poaceae with 73, or 47.7%, species of the monocotyledons reported; it includes 44, or 60.3%, aliens; 17, or 38.6%, are invasive grass species. Among the total number of 128 families reported 41, or 32.0%, list only one species; 15, or 36.6% are aliens.

ically within the Vascular Cryptogams and Gymnosperms but alphabetically within the Monocotyledons and Dicotyledons (Angiosperms). Taxonomic categories and nomenclature including status as native or alien follow Gleason and Cronquist (1991) supplemented by Holmgren (1998). Synonyms of altered nomenclature of families, genera and species appear in parentheses. Alien species are noted by (\*) and invasive aliens by (\*\*); eight species listed after 1979 are noted by (†) and invasives by (††). Voucher specimens have been collected and are in the investigator's collection.

**Results.** This study, a 25 year compilation of five major groups of vascular plants found along the Bronx River Parkway Reservation, identifies 128 families, 387 genera, and 785 species including 279, or 35.5%, nonindigenous taxa (Table 1). The largest group is the Herbaceous Dicotyledons consisting of 52 families 186 genera, and 411 species with 162 aliens followed by Wood Dicotyledons with 45 families, 93 genera, and 180 species of which 66 are aliens. The two dicotyledon groups combined represent 97 families, 279 genera, and 591 species of which 228, or 38.6%, are nonindigenous. Of the total number of vascular species reported, 785, the dicotyledons account for 75.3%, of the families, 72.1% of the genera, 75.3% of the species and 81.8% alien taxa with 29.4% invasives. And of the total number of alien species 84, or 30.1%, are invasives.

**Discussion.** This 1998 inventory of vascular plants along 10 miles of the Reservation provides a record of floral changes that may have occurred over a 25 year period. One of the grow-

ing concern is the effect of alien species upon local flora. Several of these foreign species are aggressive, invasive weeds that are displacing local native taxa, altering ecosystems and threatening the biodiversity of Reservation flora.

Although at present 35.5% of the vascular plants recorded are nonindigenous, 5.5% more than the 30% reported for New York State (Mitchell 1986), it was 31.5% 20 years ago. Invasive aliens two decades ago, constituted 10.5% of the inventoried flora and 10.7% in the 1998 report. Furthermore, 91.7% of foreign invaders have been established on the Reservation for at least 25 years; only seven have been added in two decades and these were more likely overlooked than added.

The stability of vascular flora over a quarter of a century including invasive aliens may reflect the relatively undisturbed greenspace despite minor Reservation alterations, the planting and conservation program of the County's Park Department, and to a considerable extent public and political pressure to preserve the Reservation's original design as of 1925 that qualified it for the National Register of Historic Places.

Among the 299 weeds reported in the northeast (Uva et al. 1997), 45.6%, are alien Reservation residents. Also present are 28 or 29.5%, of the 95 global invasive weeds described (Randell & Marinelli 1996).

The ten most aggressive naturalized alien intruders entrenched on the Reservation for no less than 25 years are *Ailanthus altissima*, *Alliaria petiolata*, *Ampelopsis brevipedunculata*, *Celastrus orbiculatus*, *Daucus carota*, *Hedera helix*, *Humulus japonica*, *Lonicera japonica*, *Rosa multiflora*, and threatening stands of *Pueraria lobata*. In conclusion, surveys to update the Res-

ervation vascular plant inventory, by deleting listed missing species and adding unlisted new species, are encouraged.

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### Appendix

Inventory of vascular plants of the Bronx River Parkway Reservation (1973–1998). Species nonindigenous to the Northeastern United States marked (\*); invasives (\*\*). Nonindigenous species listed after 1979 are noted (+); invasives (++)

VASCULAR CRYPTOGRAMS	<i>Picea abies</i> *	<i>C. odoratus</i>
EQUISETACEAE	<i>P. alba</i> *	<i>Eleocharis palustris</i>
<i>Equisetum arvense</i>	<i>P. nigra</i> *	<i>E. tenuis</i>
LYCOPODIACEAE	<i>P. pungens</i>	<i>Scirpus americanus</i>
<i>Lycopodium digitatum</i>	<i>P. resinosa</i>	<i>S. atrovirens</i>
<i>L. obscurum</i>	<i>P. rigida</i>	<i>S. cyperinus</i>
ASPLENIACEAE	<i>P. strobus</i>	<i>S. microcarpus</i>
<i>Asplenium platyneuron</i>	<i>P. sylvestris</i> *	( <i>S. rubrotinctus</i> )
<i>Athyrium filix-femina</i>	<i>Tsuga canadensis</i>	<i>S. validus</i>
( <i>A. angustum</i> )	TAXACEAE	DIOSCOREACEAE
<i>A. thelyperoides</i>	<i>Taxus canadensis</i>	<i>Dioscorea villosa</i>
<i>Dryopteris carthusiana</i>	LILIOPSIDA: Monocotyledons	HYDROCHARITACEAE
<i>D. cristata</i>	ALISMACEAE	<i>Elodea canadensis</i>
<i>D. goldiana</i>	<i>Alisma trivale</i>	IRIDACEAE
<i>D. marginalis</i>	<i>Sagittaria graminea</i>	<i>Iris pseudoacorus</i> *
<i>Polystichum acrosticoides</i>	<i>S. latifolia</i>	<i>I. versicolor</i>
<i>Thelypteris noveboracensis</i>	ACORACEAE	<i>Sisyrinchium angustifolium</i>
<i>T. palustris</i>	<i>Acorus calamus</i>	<i>S. montanum</i>
<i>Woodsia obtusa</i>	ARACEAE	JUNCACEAE
DENNSTAEDTIACEAE	<i>Arisaema triphyllum</i>	<i>Juncus canadensis</i>
<i>Dennstaedtia punctilobula</i>	<i>Calla palustris</i>	<i>J. compressus</i>
<i>Pteridium aquilinum</i>	<i>Peltandra virginica</i>	<i>J. effusus</i>
ONOCLEACEAE	<i>Symplocarpus foetidus</i>	<i>J. tenuis</i>
<i>Matteuccia struthiopteris</i>	COMMELINACEAE	<i>Luzula campestris</i>
<i>Onoclea sensibilis</i>	<i>Commelina communis</i> **	LEMNACEAE
OPHIOGLOSSACEAE	<i>Tradescantia virginiana</i>	<i>Lemna minor</i>
<i>Botrychium virginianum</i>	CYPERACEAE	LILIACEAE
OSMUNDACEAE	<i>Carex cephalophora</i>	<i>Allium canadense</i>
<i>Osmunda cinnamomea</i>	<i>C. crinata</i>	<i>A. tricoccum</i>
<i>O. claytoniana</i>	<i>C. cristatella</i>	<i>A. vineale</i> **
<i>O. regalis</i>	<i>C. laxiflora</i>	<i>Asparagus officinalis</i> *
POLYPODIACEAE	<i>C. lupulina</i>	<i>Convallaria majalis</i> *
<i>Polypodium virginianum</i>	<i>C. lurida</i>	<i>Erythronium americanum</i>
GYMNOSPERMS	<i>C. pennsylvanica</i>	<i>Galanthus nivalis</i> *
CUPRESSACEAE	<i>C. rosea</i>	<i>Hemerocallis fulva</i> *
<i>Chamaecyparis thyoides</i>	<i>C. scoparia</i>	<i>Hypoxis hirsuta</i>
<i>Juniperus communis</i>	<i>C. stricta</i>	<i>Lilium canadense</i>
<i>Thuja occidentalis</i>	<i>C. tribuloides</i>	<i>L. philadelphicum</i>
<i>T. occidentalis</i> *	<i>C. vulpinoidea</i>	<i>Maianthemum canadense</i>
GINKGOACEAE	( <i>C. annectens</i> )	<i>Medeola virginiana</i>
<i>Ginkgo biloba</i> *	<i>Cyperus compressus</i>	<i>Muscari botryoides</i> *
PINACEAE	<i>C. diandrus</i>	<i>Ornithogalum umbellatum</i> *
<i>Abies balsamea</i>	<i>C. esculentus</i>	<i>Polygonatum biflorum</i>
<i>Cedrus atlanticus</i> *	<i>C. erythrorhizos</i>	<i>P. pubescens</i>
<i>Larix laricina</i>	<i>C. filiculmis</i>	<i>Scilla sibirica</i> *

**Appendix**  
Continued.

<i>Smilacina racemosa</i>	<i>M. schreberi</i>	AQUIFOLIACEAE
<i>Uvularia perfoliata</i>	<i>Panicum capillare</i>	<i>Ilex opaca</i>
<i>U. sessilifolia</i>	<i>P. clandestinum</i>	<i>I. verticillata</i>
<i>Veratrum viride</i>	<i>P. dichotomiflorum</i>	ARALIACEAE
ORCHIDACEAE	<i>P. dichotomum</i>	<i>Aralia spinosa</i>
<i>Epipactis helleborine*</i>	<i>P. lanuginosum*</i>	<i>Hedera helix**</i>
POACEAE (Gramineae)	<i>P. miliaceum*</i>	BERBERIDACEAE
<i>Agrostis capillaris*</i>	<i>P. scoparium</i>	<i>Berberis thunbergii**</i>
( <i>A. tenuis</i> )	<i>P. villosissimum</i>	BETULACEAE
<i>A. gigantea**</i>	<i>P. virgatum</i>	<i>Alnus glutinosa+++*</i>
( <i>A. alba</i> )	<i>Paspalum setaceum</i>	<i>A. serrulata</i>
<i>A. hyemalis</i>	<i>Phleum pratense*</i>	<i>Betula lenta</i>
<i>A. perennans</i>	<i>Phragmites australis</i>	<i>B. papyrifera</i>
<i>Alopecurus pratensis*</i>	( <i>P. communis</i> )	<i>B. populifolia</i>
<i>Andropogon virginicus*</i>	<i>Poa annua**</i>	<i>Carpinus caroliniana</i>
<i>Anthoxanthum odoratum**</i>	<i>P. compressa*</i>	<i>Corylus americana</i>
<i>Arrhenatherum elatius*</i>	<i>P. pratensis**</i>	<i>C. cornuta</i>
<i>Avena sativa*</i>	<i>P. trivialis*</i>	<i>Ostrya virginiana</i>
<i>Brachyelytrum erectum</i>	<i>Schizachyrium scoparium</i>	BIGNONIACEAE
<i>Bromus ciliatus</i>	( <i>Andropogon</i> s.)	<i>Catalpa bignonioides*</i>
<i>B. commutatus*</i>	<i>Setaria faberi**</i>	<i>C. speciosa</i>
<i>B. inermis**</i>	<i>S. glauca**</i>	<i>Paulownia tomentosa*</i>
<i>B. japonicus**</i>	<i>S. viridis</i>	BUXACEAE
<i>B. tectorum**</i>	<i>Tridens flavus</i>	<i>Pachysandra terminalis*</i>
<i>Calamagrostis canadensis</i>	( <i>Triodia</i> f.)	CAESALPINIACEAE
<i>C. cinnoides</i>	<i>Vulpia octoflora</i>	<i>Cercis canadensis</i>
<i>Cinna arundinacea</i>	( <i>Festuca</i> o.)	<i>Gleditsia triacanthos</i>
<i>C. latifolia</i>	PONTEDERIACEAE	CAPRIFOLIACEAE
<i>Dactylis glomerata**</i>	<i>Pontederia cordata</i>	<i>Lonicera canadensis</i>
<i>Danthonia compressa</i>	POTAMOGETONACEAE	<i>L. fragmentissima*</i>
<i>D. spicata</i>	<i>Potamogeton</i> sp.	<i>L. japonica**</i>
<i>Deschampsia flexuosa</i>	SMILACACEAE	<i>L. maackii*</i>
<i>Digitaria filiformis</i>	<i>Smilax glauca</i>	<i>L. tartarica**</i>
<i>D. ischaemum*</i>	<i>S. herbacea</i>	<i>Sambucus canadensis</i>
<i>D. sanguinalis**</i>	<i>S. rotundifolia</i>	<i>Viburnum acerifolium</i>
<i>Echinochloa crusgalli**</i>	SPARGANIACEAE	<i>V. alnifolium</i>
<i>E. walteri</i>	<i>Sparganium americanum</i>	<i>V. dentatum</i>
<i>Eleusine indica**</i>	<i>S. eurycarpum</i>	<i>V. lantana*</i>
<i>Elymus canadensis</i>	TYPHACEAE	<i>V. lentago</i>
<i>E. hystrix</i>	<i>Typha angustifolia</i>	<i>V. molle</i>
<i>E. riparius</i>	<i>T. latifolia</i>	<i>V. nudum</i>
<i>E. trachycaulus</i>	XYRIDACEAE	<i>V. prunifolium</i>
<i>E. virginicus</i>	<i>Xyris caroliniana</i>	<i>V. sieboldii**</i>
<i>Elytrigia repens**</i>	DICOTYLEDONS: Woody Plants	CELASTRACEAE
( <i>Agropyron</i> r.)	ACERACEAE	<i>Celastrus orbiculatus**</i>
<i>Eragrostis capillaris</i>	<i>Acer campestre*</i>	<i>Euonymus alatus**</i>
<i>E. cilianensis+++*</i>	<i>A. negundo</i>	<i>E. fortunei+++*</i>
( <i>E. megastachya</i> )	<i>A. nigrum</i>	CLETHRACEAE
<i>E. pectinacea</i>	<i>A. palmatum*</i>	<i>Clethra alnifolia</i>
<i>E. spectabilis</i>	<i>A. platanoides**</i>	CORNACEAE
<i>Festuca elatior**</i>	<i>A. pseudoplatanus*</i>	<i>Cornus amomum</i>
<i>F. pratensis*</i>	<i>A. rubrum</i>	<i>C. florida</i>
<i>F. rubra*</i>	<i>A. saccharinum</i>	<i>C. mas*</i>
<i>Glyceria striata</i>	<i>A. saccharum</i>	<i>C. kousa*</i>
<i>Holcus lanatus*</i>	ANACARDIACEAE	<i>C. racemosa</i>
<i>Hordeum jubatum</i>	<i>*Cotinus coggygria*</i>	<i>C. sericea</i>
<i>Leersia oryzoides*</i>	<i>C. obovatus</i>	( <i>C. stolonifera</i> )
<i>L. virginica</i>	<i>Rhus copallinum</i>	<i>Nyssa sylvatica</i>
<i>Lolium perenne*</i>	<i>R. glabra</i>	ELAEAGNACEAE
( <i>L. multiflorum</i> )	<i>R. typhina</i>	<i>Elaeagnus angustifolia*</i>
<i>Microstegium vimineum*</i>	<i>Toxicodendron radicans</i>	ERICACEAE
( <i>Eulalia</i> v.)	APOCYNACEAE	<i>Andromeda japonica*</i>
<i>Muhlenbergia frondosa</i>	<i>Vinca minor*</i>	<i>Gaultheria procumbens</i>

**Appendix**  
Continued.

<i>Kalmia angustifolia</i>	MYRICACEAE	SIMAROUBACEAE
<i>K. latifolia</i>	<i>Myrica pensylvanica</i>	<i>Ailanthus altissima**</i>
<i>Rhododendron maximum</i>	OLERACEAE	STAPHYLACEAE
<i>R. periclymenoides</i>	<i>Forsythia intermedia*</i>	<i>Staphylea trifolia</i>
( <i>R. nudiflorum</i> )	<i>F. suspensa*</i>	STYRACACEAE
<i>Vaccinium corymbosum</i>	<i>Fraxinus americana</i>	<i>Halesia tetraptera*</i>
<i>V. pallidum</i>	<i>F. nigra</i>	( <i>H. carolina</i> )
( <i>V. vacillans</i> )	<i>F. pennsylvanica</i>	TILACEAE
FABACEAE (Leguminosae)	<i>F. quadrangulata</i>	<i>Tilia americana</i>
<i>Amorpha fruticosa*</i>	<i>Ligustrum ovalifolium*</i>	<i>T. cordata*</i>
<i>Cladrastis lutea</i>	<i>L. vulgare*</i>	ULMACEAE
<i>Pueraria lobata*</i>	<i>Syringa vulgaris*</i>	<i>Celtis occidentalis</i>
<i>Robinia pseudoacacia</i>	PLATANACEAE	<i>Ulmus americana</i>
<i>Sophora japonica*</i>	<i>Platanus acerifolia*</i>	<i>U. rubra</i>
<i>Wisteria floribunda*</i>	<i>P. occidentalis</i>	<i>U. pumila*</i>
FAGACEAE	RANUNCULACEAE	VITACEAE
<i>Castanea dentata</i>	<i>Clematis virginiana</i>	<i>Ampelopsis brevipedunculata**</i>
<i>Fagus grandifolia</i>	<i>Xanthorhiza simplicissima</i>	<i>Pathenocissus quinquefolia</i>
<i>F. sylvestris*</i>	RHAMNACEAE	<i>P. tricuspidata++**</i>
<i>Quercus alba</i>	<i>Ceanothus americanus</i>	<i>Vitis aestivalis</i>
<i>Q. bicolor</i>	<i>Rhamnus cathartica*</i>	<i>V. labrusca</i>
<i>Q. coccinea</i>	ROSACEAE	<i>V. novae-angliae</i>
<i>Q. imbricaria</i>	<i>Amelanchier arborea</i>	<i>V. riparia</i>
<i>Q. macrocarpa</i>	<i>A. canadensis</i>	DICOTYLEDONS: Herbaceous Plants
<i>Q. phellos</i>	<i>Aronia melanocarpa</i>	AMARANTHACEAE
<i>Q. prinus</i>	( <i>Pyrus m.</i> )	<i>Amaranthus caudatus</i>
( <i>Q. montana</i> )	<i>Crataegus crus-galli</i>	<i>A. hybridus</i>
<i>Q. robur*</i>	<i>Kerria japonica*</i>	<i>A. retroflexus**</i>
<i>Q. rubra</i>	<i>Prunus avium*</i>	APIACEAE (Umbelliferae)
<i>Q. velutina</i>	<i>P. pensylvanica</i>	<i>Aegopodium podagraria*</i>
GROSSULARIACEAE	<i>P. serotina</i>	<i>Aethusa cynapium</i>
<i>Ribes americanum</i>	<i>P. virginiana</i>	<i>Anthriscus sylvestris++**</i>
HAMAMELIDACEAE	<i>Pyrus communis*</i>	<i>Cicuta maculata</i>
<i>Hamamelis virginiana</i>	<i>P. malus*</i>	<i>Cryptotaenia canadensis</i>
<i>Liquidambar styraciflua</i>	<i>Rhodotypos scandens*</i>	<i>Daucus carota**</i>
HIPPOCASTANACEAE	<i>Rosa eglanteria*</i>	<i>Heracleum lanatum</i>
<i>Aesculus hippocastanum*</i>	<i>R. multiflora*</i>	<i>Hydorcotyle americana</i>
HYDRANGEACEAE	<i>R. rugosa*</i>	<i>Osmorhiza claytonii</i>
<i>Hydrangea petiolaris</i>	<i>Rubus allegheniensis</i>	<i>O. longistylis</i>
<i>Philadelphus coronarius*</i>	<i>R. canadensis</i>	<i>Pastinaca sativa*</i>
JUGLANDACEAE	<i>R. flagellaris</i>	<i>Sanicula marilandica</i>
<i>Carya cordiformis</i>	<i>R. idaeus*</i>	<i>S. trifoliata</i>
<i>C. glabra</i>	<i>R. laciniatus</i>	<i>Zizia aurea</i>
<i>C. tomentosa</i>	<i>R. odoratus</i>	APOCYNACEAE
<i>Juglans cinera</i>	<i>R. phoenicolasius*</i>	<i>Apocynum androsaemifolium</i>
<i>J. nigra</i>	<i>Spiraea alba</i>	<i>A. cannabinum</i>
LAURACEAE	<i>S. tomentosa</i>	ARALIACEAE
<i>Lindera benzoin</i>	RUBIACEAE	<i>Aralis nudicaulis</i>
<i>Sassafras albidum</i>	<i>Cephalanthus occidentalis</i>	<i>A. racemosa</i>
MAGNOLIACEAE	RUTACEAE	<i>Panax quinquefolius</i>
<i>Liriodendron tulipifera</i>	<i>Ptelea trifoliata</i>	ARISTOLOCHIACEAE
<i>Magnolia acuminata</i>	SALICACEAE	<i>Asarum canadense</i>
<i>M. virginiana</i>	<i>Populus alba*</i>	ASCLEPIADACEAE
MALVACEAE	<i>P. deltoides</i>	<i>Asclepias incarnata</i>
<i>Hibiscus syriacus*</i>	<i>P. grandidentata</i>	<i>A. purpurascens</i>
MENISPERMACEAE	<i>P. tremuloides</i>	<i>A. syriaca</i>
<i>Menispermum canadense</i>	<i>Salix alba*</i>	<i>A. tuberosa</i>
MIMOSACEAE	<i>S. babylonica*</i>	ASTERACEAE (Compositae)
<i>Albizia julibrissin*</i>	<i>S. discolor</i>	<i>Achillea millefolium**</i>
MORACEAE	<i>S. fragilis*</i>	<i>Ambrosia artemisiifolia</i>
<i>Maclura pomifera*</i>	<i>S. nigra</i>	<i>A. trifida</i>
<i>Morus alba*</i>	SAPINDACEAE	<i>Anaphalis margaritacea</i>
<i>M. rubra</i>	<i>Koeleruteria paniculata*</i>	<i>Antennaria neglecta</i>

**Appendix**  
Continued.

<i>A. plantaginifolia</i>	<i>Helianthus annuus</i>	BRASSICACEAE (Cruciferae)
<i>Anthemis arvensis</i> *	<i>H. decapetalus</i>	<i>Alliaria petiolata</i> **
<i>A. cotula</i> *	<i>H. divaricatus</i>	( <i>A. officinale</i> )
<i>Arctium lappa</i> *	<i>H. giganteus</i>	<i>Armoracia rusticana</i> *
<i>A. minus</i> *	<i>Hieracium aurantiacum</i> *	( <i>A. lapathifolia</i> )
<i>Artemisia annua</i> *	<i>H. caespitosum</i> *	<i>Arabidopsis thaliana</i> **
<i>A. vulgaris</i> **	( <i>H. pratense</i> )	<i>Arabis canadensis</i>
<i>Aster acuminatus</i>	<i>H. floribundum</i> *	<i>A. hirsuta</i>
<i>A. divaricatus</i>	<i>H. kalmii</i>	<i>A. laevigata</i>
<i>A. dumosus</i>	<i>H. paniculatum</i>	<i>Barbarea verna</i> *
( <i>A. cordiformus</i> )	<i>H. scabrum</i>	<i>B. vulgaris</i> **
<i>A. ericoides</i>	<i>Hypochoeris radicata</i> *	<i>Brassica nigra</i> *
<i>A. laevis</i>	<i>Krigia biflora</i>	<i>B. rapa</i> *
<i>A. lanceolatus</i>	<i>Lactuca biennis</i>	<i>Capsella bursa-pastoris</i> **
( <i>A. simplex</i> )	<i>L. canadensis</i>	<i>Cardamine concatenata</i>
<i>A. lowrieanus</i>	<i>L. floridana</i>	( <i>Dentaria laciniata</i> )
<i>A. novae-angliae</i>	<i>L. serriola</i> **	<i>C. diphylla</i>
<i>A. novi-belgii</i>	( <i>L. scariola</i> )	( <i>Dentaria d.</i> )
<i>A. paternus</i>	<i>Lapsana communis</i> *	<i>C. pennsylvanica</i>
( <i>Sericocarpus asteroides</i> )	<i>Leontodon autumnalis</i> *	<i>C. pratensis</i> *
<i>A. puniceus</i>	<i>Matricaria matricarioides</i> *	<i>C. rhomboidea</i>
<i>A. racemosus</i>	<i>Mikania scandens</i>	( <i>C. bulbosa</i> )
<i>A. schreberi</i>	<i>Prenanthes alba</i>	<i>Coronopus didymus</i> ++**
<i>A. umbellatus</i>	<i>P. trifoliata</i>	<i>Descurainia pinnata</i>
<i>Bidens bipinnata</i>	<i>Rudbeckia hirta</i>	<i>D. sophia</i> *
<i>B. cernua</i>	<i>R. laciniata</i>	( <i>Sisymbrium s.</i> )
<i>B. comosa</i>	<i>Senecio aureus</i>	<i>Draba reptans</i>
<i>B. laevis</i>	<i>S. jacobaea</i> *	( <i>D. micrantha</i> )
<i>B. polylepis</i>	<i>S. vulgaris</i> **	<i>D. verna</i> **
<i>Carduus nutans</i> *	<i>Solidago bicolor</i>	<i>Hesperis matronalis</i>
<i>Centaurea dubia</i> *	<i>S. caesia</i>	<i>Lepidium campestre</i> **
( <i>C. vochinensis</i> )	<i>S. canadensis</i>	<i>L. virginicum</i>
<i>C. maculosa</i> *	<i>S. flexicaulis</i>	<i>Lunaria rediviva</i> *
<i>C. nigra</i> *	<i>S. juncea</i>	<i>Raphanus raphanistrum</i> *
<i>Chrysanthemum leucanthemum</i> **	<i>S. macrophylla</i>	<i>Rorippa nasturtium-aquaticum</i> *
<i>C. parthenium</i> *	<i>S. nemoralis</i>	( <i>R. sylvestris</i> )
<i>Cichorium intybus</i> **	<i>S. odora</i>	<i>Sisymbrium altissimum</i> *
<i>Cirsium arvense</i> *	<i>S. rugosa</i>	<i>S. officinale</i> *
<i>C. discolor</i>	<i>S. speciosa</i>	<i>Thlaspi arvense</i> *
<i>C. pumilum</i>	<i>Sonchus arvensis</i> **	CAESALPINACEAE
<i>C. vulgare</i> **	<i>S. asper</i> **	<i>Chamaecrista nictitans</i>
<i>Conyza canadensis</i>	<i>S. oleraceus</i> **	( <i>Cassia n.</i> )
( <i>Erigeron c.</i> )	<i>Tanacetum vulgare</i> *	CAMPANULACEAE
<i>Erechtites hieraciifolia</i>	<i>Taraxacum officinale</i> **	<i>Campanula rapunculoides</i> *
<i>Erigeron annuus</i>	<i>Tragopogon dubius</i> *	<i>Lobelia inflata</i>
<i>E. philadelphicus</i>	<i>T. porrifolius</i> *	<i>L. siphilitica</i>
<i>E. strigosus</i>	<i>Tussilago farfara</i> *	<i>Triodanis perfoliata</i>
<i>Eupatorium album</i>	<i>Vernonia noveboracensis</i>	( <i>Specularia p.</i> )
<i>E. coelestinum</i>	<i>Xanthium strumarium</i> *	CANNABACEAE
<i>E. dubium</i>	BALSAMINACEAE	<i>Humulus japonicus</i> **
<i>E. fistulosum</i>	<i>Impatiens capensis</i>	<i>H. lupulus</i>
<i>E. maculatum</i>	<i>I. pallida</i>	CAPPARACEAE
<i>E. perfoliatum</i>	BERBERIDACEAE	<i>Cleome hassleriana</i> *
<i>E. rugosum</i>	<i>Caulophyllum thalictroides</i>	( <i>C. spinosa</i> )
<i>E. sessilifolia</i>	<i>Podophyllum peltatum</i>	CAROPHYLLACEAE
<i>Euthamia graminifolia</i>	BORAGINACEAE	<i>Arenaria serpyllifolia</i> *
( <i>Solidago g.</i> )	<i>Anchusa arvensis</i> *	<i>Cerastium vulgatum</i> *
<i>E. tenuifolia</i>	<i>Echium vulgare</i> *	<i>Dianthus armeria</i> *
( <i>Solidago t.</i> )	<i>Mertensia virginica</i>	<i>Paronychia fastigiata</i>
<i>Galinsoga parviflora</i> **	<i>Myosotis arvensis</i>	<i>Sagina procumbens</i>
<i>G. quadriradiata</i> *	<i>M. micrantha</i> *	<i>Saponaria officinalis</i> *
( <i>G. ciliata</i> )	<i>M. scorpioides</i> *	<i>Scleranthus annuus</i> *
<i>Gnaphalium obtusifolium</i>	<i>Symphytum officinale</i> *	<i>Silene caroliniana</i>

**Appendix**  
Continued.

<i>S. latifolia</i> *	<i>T. pratense</i> **	<i>L. palustris</i>
<i>S. stellata</i>	<i>T. repens</i> **	<i>Oenothera biennis</i>
<i>S. vulgaris</i> *	<i>Vicia americana</i>	OROBANCHACEAE
( <i>S. cucubalus</i> )	<i>V. crassa</i> *	<i>Epifagus virginiana</i>
<i>Stellaria graminea</i> *	<i>V. sativa</i> *	<i>Orobanche uniflora</i>
<i>S. media</i> **	<i>V. tetrasperma</i> *	OXALIDACEAE
<i>S. pubera</i>	<i>V. villosa</i> *	<i>Oxalis europaea</i> *
CHENOPODIACEAE	FUMARIACEAE	<i>O. stricta</i>
<i>Chenopodium album</i> **	<i>Dicentra cucullaria</i>	PAPAVERACEAE
<i>C. ambrosioides</i> *	GERANIACEAE	<i>Chelidonium majus</i> *
<i>C. botrys</i> *	<i>Erodium cicutarium</i> *	<i>Sanguinaria canadensis</i>
<i>C. simplex</i>	<i>Geranium bicknellii</i>	<i>Stylophorum diphyllum</i>
CLUSTACEAE (Guttiferae)	<i>G. carolinianum</i>	PHYTOLACCACEAE
<i>Hypericum perforatum</i> *	<i>G. maculatum</i>	<i>Phytolacca americana</i>
<i>H. punctatum</i>	<i>G. robertianum</i> *	PLANTAGINACEAE
CONVULVULACEAE	HALORAGACEAE	<i>Plantago lanceolata</i> **
<i>Calystegia sepium</i> **	<i>Proserpinaca palustris</i>	<i>P. major</i> **
( <i>Convolvulus</i> s.)	HYDROPHYLLACEAE	<i>P. rugelii</i>
<i>Convolvulus arvensis</i> **	<i>Hydrophyllum virginianum</i>	POLEMONIACEAE
<i>Ipomoea purpurea</i> **	LAMIACEAE (Labiatae)	<i>Phlox divaricata</i>
CRASSULACEAE	<i>Ajuga reptans</i> *	<i>P. glaberrima</i>
<i>Sedum acre</i> *	<i>Collinsonia canadensis</i>	<i>P. paniculata</i>
<i>S. purpureum</i> *	<i>Galeopsis tetrahit</i> *	<i>Polemonium reptans</i>
CUCURBITACEAE	<i>Glechoma hederacea</i> **	POLYGONIACEAE
<i>Echinocystis lobata</i>	<i>Lamium amplexicaule</i> **	<i>Polygonum arenastrum</i> *
<i>Sicyos angulatus</i>	<i>L. purpureum</i> ++**	<i>P. arifolium</i>
CUSCUTACEAE	<i>Leonurus cardiaca</i> *	<i>P. aviculare</i>
<i>Cuscuta gronovii</i>	<i>Lycopus americanus</i>	<i>P. caespitosum</i> *
DIPSACACEAE	<i>Mentha arvensis</i>	<i>P. convolvulus</i> *
<i>Dipsacus sylvestris</i> *	<i>M. spicata</i> *	<i>P. cuspidatum</i> **
EUPHORBIACEAE	<i>Monarda fistulosa</i>	<i>P. erectum</i>
<i>Acalpha ostryifolia</i>	<i>Nepeta cataria</i> *	<i>P. hydropiper</i> *
<i>A. rhomboidea</i>	<i>Prunella vulgaris</i> *	<i>P. hydropiperoides</i>
<i>Euphorbia cyparissias</i> **	<i>Pycnanthemum tenuifolium</i>	<i>P. lapathifolium</i> *
<i>E. maculata</i>	<i>Satureja vulgaris</i> *	<i>P. orientale</i> *
<i>E. vermiculata</i>	<i>Scutellaria galericulata</i>	<i>P. pennsylvanicum</i>
FABACEAE (Leguminosae)	( <i>S. epilobifolia</i> )	<i>P. persicaria</i> **
<i>Amphicarpaea bracteata</i>	<i>S. laterifolia</i>	<i>P. punctatum</i>
<i>Apios americana</i>	LENTIBULARIACEAE	<i>P. sagittatum</i>
<i>Baptisia tinctoria</i>	<i>Utricularia vulgaris</i>	<i>P. scandens</i>
<i>Coronilla varia</i> **	LIMNANTHACEAE	<i>P. virginianum</i>
<i>Desmodium canadense</i>	<i>Floerkea proserpinacoides</i>	( <i>Tovara</i> v.)
<i>D. glutinosum</i>	LYTHRACEAE	<i>Rumex acetosella</i> **
<i>D. nudiflorum</i>	<i>Lythrum alatum</i>	<i>R. crispus</i> **
<i>D. paniculatum</i>	<i>L. salicaria</i> **	<i>R. obtusifolius</i> **
<i>D. rotundifolium</i>	MALVACEAE	PORTULACACEAE
<i>Lathyrus palustris</i>	<i>Malva neglecta</i> *	<i>Claytonia virginica</i>
<i>Lespedeza hirta</i>	<i>M. moschata</i> *	<i>Portulaca oleracea</i> **
<i>L. intermedia</i>	MOLLUGINACEAE	PRIMULACEAE
<i>L. procumbens</i>	<i>Mollugo verticillata</i> **	<i>Lysimachia ciliata</i>
<i>L. virginica</i>	MONOTROPACEAE	<i>L. nummularia</i> *
<i>Medicago lupulina</i> *	<i>Monotropa uniflora</i>	<i>L. quadriflora</i>
<i>M. sativa</i> *	NYCTAGINACEAE	PYROLACEAE
<i>Melilotus alba</i> *	<i>Mirabilis nyctaginea</i>	<i>Chimaphila maculata</i>
<i>M. officinalis</i> *	<i>M. jalapa</i> *	<i>C. umbellata</i>
<i>Strophostyles helvula</i>	ONOGRACEAE	RANUNCULACEAE
<i>Trifolium arvense</i> *	<i>Circaea lutetiana</i>	<i>Actaea alba</i>
<i>T. aureum</i> *	( <i>C. quadrisculata</i> )	( <i>A. pachypoda</i> )
( <i>T. agrarium</i> )	<i>Epilobium angustifolium</i>	<i>A. rubra</i>
<i>T. campestre</i> *	<i>E. coloratum</i>	<i>Anemone quinquefolia</i>
( <i>T. procumbens</i> )	<i>E. glandulosum</i>	<i>A. virginiana</i>
<i>T. dubium</i> *	<i>E. hirsutum</i> *	<i>Anemonella thalictroides</i>
<i>T. hybridum</i> *	<i>Ludwigia alternifolia</i>	( <i>Thalictrum</i> t.)



**Appendix**  
Continued.

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<i>Caltha palustris</i>	<i>G. asprellum</i>	<i>V. filiformis*</i>
<i>Cimicifuga racemosa</i>	<i>G. circaezans</i>	<i>V. officinalis*</i>
<i>Helleborus viridis*</i>	<i>G. mollugo**</i>	<i>V. peregrina</i>
<i>Hepatica americana</i>	<i>G. triflorum</i>	<i>V. serpyllifolia*</i>
<i>Ranunculus abortivus</i>	<i>Mitchella repens</i>	SOLANACEAE
<i>R. acris**</i>	SAXIFRAGACEAE	<i>Datura stramonium</i>
<i>R. bulbosus*</i>	<i>Penthorum sedoides</i>	<i>Physalis heterophylla</i>
<i>R. ficaria++**</i>	<i>Saxifraga virginensis</i>	<i>Solanum carolinense</i>
<i>R. hispidus</i>	SCROPHULARIACEAE	<i>S. dulcamara**</i>
<i>R. pensylvanicus</i>	<i>Agalinis tenuifolia</i>	<i>S. nigrum</i>
<i>R. recurvatus</i>	( <i>Gerardia</i> t.)	URTICACEAE
<i>R. repens**</i>	<i>Aureolaria laevigata</i>	<i>Boehmeria cylindrica</i>
<i>Thalictrum dioicum</i>	( <i>Gerardia</i> l.)	<i>Laportea canadensis</i>
<i>T. pubescens</i>	<i>Chelone glabra</i>	<i>Pilea pumula</i>
( <i>T. polygamum</i> )	<i>Cymbalaria muralis*</i>	<i>Urtica dioica**</i>
ROSACEAE	<i>Gratiola aurea</i>	VERBENACEAE
<i>Agrimonia gryposepala</i>	<i>G. neglecta</i>	<i>Verbena hastata</i>
<i>Duchesnea indica*</i>	<i>Linaria vulgaris*</i>	<i>V. urticifolia</i>
<i>Fragaria vesca*</i>	<i>Mazus pumilus*</i>	VIOLACEAE
<i>F. virginiana</i>	( <i>M. japonicus</i> )	<i>Viola blanda</i>
<i>Geum canadense</i>	<i>Mimulus alatus</i>	<i>V. conspersa</i>
<i>G. virginianum</i>	<i>M. ringens</i>	<i>V. cucullata</i>
<i>Potentilla argentea*</i>	<i>Penstemon digitalis</i>	<i>V. pedata</i>
<i>P. canadensis</i>	<i>Scrophularia lanceolata</i>	<i>V. pubescens</i>
<i>P. norvegica*</i>	<i>Verbascum blattaria*</i>	( <i>V. pensylvanica</i> )
<i>P. recta**</i>	<i>V. thapsus**</i>	<i>V. rafinesquii</i>
<i>P. simplex</i>	<i>Veronica agrestis*</i>	<i>V. sororia</i>
RUBIACEAE	<i>V. americana</i>	( <i>V. papilionaceae</i> )
<i>Galium aparine</i>	<i>V. arvensis*</i>	<i>V. striata</i>

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