

A Checklist of the Vascular Flora of Robinson Park Glacial Drift Hill Prairies and Their Surrounding Forests, Peoria, Illinois

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ABSTRACT

A study of the vascular flora from seven hill prairies and their surrounding forests of Robinson Park, Peoria, Illinois was initiated in 1983. Five of the prairies may have been established following a brush fire on the site in 1956.

A total of 233 species belonging to 73 families were identified. Eighty-eight occurred on the hill prairies. Eighteen prairie species were found in the surrounding forested areas. *Andropogon gerardi* and *Schizachyrium scoparium* were the most abundant grasses on the hill prairies. *Acer saccharum*, *Quercus alba*, *Q. prinoides* var. *acuminata*, and *Q. rubra* were the most prevalent canopy species in the forested areas.

INTRODUCTION

Robinson Park is located in Peoria County, Illinois and consists of 230.4 ha of mixed mesic woodlands. The seven hill prairies are located along a 61.3 ha tract within the Park and are approximately 0.6-1.2 km west of the Illinois River (T10N, R8E, Sec. 28).

The hill prairies are situated on either south- or southeast-facing slopes. The steep slopes are part of the Providence Moraine. This moraine is of late Wisconsinan age and is part of the larger Bloomington Morainic System (Willman and Frye, 1970).

Four soils were identified in the study area. The Strawn-Hennepin association occurred along the ridge, north-facing slopes, and the stream bottom. These soils are calcareous upland loams that have developed from glacial till. Forest vegetation was the primary plant community found on these

soils. Dodge and Rozetta silt loams were located along the slope gradient. These soils have developed from eolian deposits of late Wisconsinan age. Prairie vegetation was the principal plant community identified with these soils. The four soils are forest alfisols.

Aerial photographs of Robinson Park taken in 1939, showed two large hill prairies of approximately 0.5-0.8 ha surrounded by scrub vegetation. A brush fire in the spring of 1956 burned several hundred hectares of land within this area. Aerial photographs of the area in 1957 indicated that the original two prairies had expanded and five new prairies had developed in the area. The 1957 photograph showed that each prairie was surrounded by scrub vegetation and a sparsely developed tree canopy. Both of the original 1939 prairies had become partitioned by 1982. An aerial photograph taken in this year showed nine prairie openings surrounded by a dense tree canopy.

The initial vascular flora survey of the Robinson Park hill prairie sites began in 1983. Examination of the original 1939 prairies showed that one had been divided since by forest invasion. The larger portion of this prairie exhibited severe surface erosion due to water drainage. The other prairie had been divided into two smaller portions by a large gully which developed in an area where a small rock quarry had been located. The rock quarry can be observed in the 1957 photograph. Minimal surface erosion was visible on the main portion of the second prairie. However, along the gully perimeter, soil has washed away beneath the roots of the prairie vegetation, and whole clumps of prairie grasses and forbs have washed into the gully. The other five prairie sites showed little signs of erosion. Two of the sites appeared to be stable prairie communities based on their vegetative composition. The three remaining sites were in various stages of succession to forest.

METHODS AND MATERIALS

The nine hill prairies of Robinson Park were numbered consecutively beginning with the southern most prairie. Approximate areas were determined for each prairie with a metal surveyors tape. Prairies 2, 3, 4, and 6 were the largest and measured between 0.05-0.09 ha. Prairies 1, 5, and 7 were of intermediate size and measured between 0.02-0.03 ha. Prairies 8 and 9 were the smallest and measured 0.01 ha.

Seven of the nine prairies were chosen for floristic sampling. Plants in flower were collected from each prairie and the surrounding forested sites either weekly or bi-weekly from March until November of 1983 through 1986. Plant nomenclature followed Mohlenbrock (1986). Preserved samples of the collected plant materials are housed in the Bradley University Herbarium.

RESULTS AND DISCUSSION

A total of 233 species belonging to 73 families were identified from the seven Robinson Park hill prairies and their surrounding forests (Table 1). Prairie species are designated by an asterisk (*). Prairie species that occurred in the surrounding forested areas are designated by an exclamation point (!). The best

represented families were the Asteraceae (47 spp.), Poaceae (21 spp.), Fabaceae (13 spp.), and Rosaceae (13 spp.).

Eighty-eight hill prairie species were identified from the seven Robinson Park sites. The hill prairie vegetation was indicative of dry to dry mesic grass communities (Curtis, 1959). The principal grass species found on the prairies were *Andropogon gerardi* Vitman, *Bouteloua curtipendula* (Michx.) Torr., *Schizachyrium scoparium* (Michx.) Nash, and *Sporobolus heterolepis* (Gray) Gray. Other prairie taxa included were *Amorpha canescens* Pursh, *Apocynum androsaemifolium* L., *Asclepias verticillata* L., *A. viridiflora* Raf., *Aster azureus* Lindl., *A. oblongifolius* Nutt., *Brickellia eupatorioides* (L.) Shinnery, *Carex tetanica* Schk., *Coreopsis palmata* Nutt., *Dalea purpurea* Vent., *Echinacea pallida* Nutt., *Euphorbia corollata* L., *Helianthus hirsutus* Raf., *Liatris aspera* Michx., *Linum sulcatum* Riddell, *Psoralea tenuiflora* Pursh, *Silphium integrifolium* Michx., and *Sisyrinchium campestre* Bickn.

Two types of forests surround the Robinson Park hill prairies. An oak-hickory forest occupied the ridge area while the lower slopes consisted of a mesic hardwood forest. The dominant canopy species of the oak-hickory forest were *Quercus alba* L. and *Q. rubra* L. Some of the other commonly associated canopy species were *Carya ovata* (Mill.) K. Koch, *C. tomentosa* (Poir.) Nutt., *Fraxinus americana* L., *Populus grandidentata* Michx., *Quercus prinoides* Willd. var. *acuminata* (Michx.) Gl. and *Q. velutina* Lam. Among the small tree and shrub layer, the dominant species were *Amelanchier arborea* (Michx.f.) Fern., *Cornus racemosa* Lam., *Crataegus pruinosa* (Wendl.) K. Koch, *Malus ioensis* (Wood) Britt., *Morus rubra* L., *Prunus serotina* Ehrh., *Rubus allegheniensis* Porter, *R. occidentalis* L., *Sassafras albidum* (Nutt.) Nees, and *Viburnum rafinesquianum* Schultes. In addition, there were numerous saplings of *Acer saccharum* Marsh, *Ostrya virginiana* (Mill.) K. Koch, *Quercus prinoides* var. *acuminata*, and *Q. rubra*.

The herbaceous species encountered most often in the forest were *Aster anomalous* Engelm., *A. shortii* Lindl., *Bromus purgans* L., *Carex pensylvanica* Lam., *Danthonia spicata* (L.) Roem. & Schultes, *Desmodium glutinosum* (Muhl.) Wood, *Galium concinnum* Torr. & Gray, *Parthenocissus quinquefolia* (L.) Planch., *Phryma leptostachya* L., *Solidago caesia* L., *S. ulmifolia* Muhl., *Taenidia integerrima* (L.) Drude, and *Toxicodendron radicans* (L.) Kuntze.

Individuals of *A. saccharum*, *Q. prinoides* var. *acuminata*, and *Q. rubra* were the dominant canopy species growing along the lower slope gradient. An abrupt and distinct change in the tree flora occurred along the stream bottom. *Carya cordiformis* (Wang.) K. Koch, *Celtis occidentalis* L., *Juglans nigra* L., *Populus deltoides* Marsh, *Quercus macrocarpa* Michx., and *Ulmus americana* L. constituted the tree canopy of this area. These bottomland trees were taller and had larger tree trunks which suggest a more mature mesic forest community along the stream bottom (Braun, 1947; Curtis, 1959). *Acer saccharum* was the most numerous tree species of this forest. However, this species had not attained the stature of the canopy trees.

CONCLUSIONS

Seventy-five percent of the flora found on the Robinson Park hill prairies was representative of native American prairie species (Weaver, 1954). The remainder of this flora consisted of forest tree invaders, herbaceous forest species, and a few adventive weeds. *Quercus prinoides* var. *acuminata* and *Fraxinus americana* were the most common forest tree invaders. The herbaceous forest invaders contained species commonly found in the open woods e.g. *Aureolaria grandiflora* (Benth.) Pennell var. *pulchra* Pennell, and *Helianthus divaricatus* L. Adventive weeds, such as *Scleranthus annuus* L. and *Asparagus officinalis* L., were rare on the prairies. The scarcity of weedy individuals indicated that these hill prairies were relatively undisturbed by human activities (Weaver, 1954). *Poa pratensis* L. and *Melilotus alba* Medic. were conspicuously absent on the prairies. However, *P. pratensis* was found growing in the forested area on the ridge.

Alfisols develop slowly in areas that contain forest vegetation (Eyre, 1963; Fitzpatrick, 1971; Harpstead and Hole, 1980). The presence of these soils throughout the study site suggested that forest vegetation had been associated with the area for a long time. However, scrub vegetation occupied most of the ridge and slopes of this area in 1939. Subsequent photographs of the site documented the gradual replacement of the scrub vegetation with a dense tree canopy. There are two probable explanations for the scrub vegetation observed in the 1939 photograph. Fire is the most plausible explanation for the lack of a tree canopy, or periodic droughts, similar to those that occurred in the 1930's, could have retarded the development of a forest canopy. This latter explanation would lend support to the Britton and Messenger (1969) findings that Prairie Peninsula soil moisture during the drought of 1933-34 was similar to that normally recorded for the steppe areas like the Great Plains. These investigators suggested that the soil moisture amount when coupled to an abnormal high water deficit could have been instrumental in the death of numerous trees. A brush fire occurred on this site in 1956. Previous fires may have burned the area on other occasions. Therefore it is possible that the five new 1957 prairies developed as a result of this fire and were maintained afterwards by periodic drought conditions. Development of a dense tree canopy in this area by 1982 was due to the lack of later fires in this area.

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Table 1. Checklist of plant taxa collected from seven hill prairies and their surrounding forested areas in Robinson Park

ACANTHACEAE

- * *Ruellia humilis* Nutt.

ACERACEAE

- Acer saccharum* Marsh

ANACARDIACEAE

- * *Rhus aromatica* Ait.

R. glabra L.

- Toxicodendron radicans* (L.) Kuntze

APIACEAE

- Osmorhiza claytonii* (Michx.) Clarke

- O. longistylis* (Torr.) DC

- Sanicula canadensis* L.

- S. gregaria* Bickn.

- Taenidia integerrima* (L.) Drude

- Zizia aurea* (L.) Koch

APOCYNACEAE

- * *Apocynum androsaemifolium* L.

- * *A. cannabinum* L.

ARACEAE

- Arisaema triphyllum* (L.) Schott

ARALIACEAE

- Panax quinquefolius* L.

ARISTOLOCHIACEAE

- Asarum canadense* L.

ASCLEPIADACEAE

- !* *Asclepias quadrifolia* Jacq.

- * *A. purpurascens* L.

- * *A. tuberosa* L.

- * *A. verticillata* L.

- * *A. viridiflora* Raf.

ASPLENACEAE

- Cystopteris protrusa* (Weatherby) Blasd.

ASTERACEAE

- Ambrosia artemisiifolia* (L.) Richards

- * *Antennaria plantaginifolia* L.

- Aster anomalous* Engelm.

- * *A. azureus* Lindl.

- A. cordifolius* L.

- A. ericoides* L.

- !* *A. laevis* L.

- A. macrophyllus* L.

- * *A. oblongifolius* Nutt.

- A. pilosus* Willd.

- A. X sagittifolius* Wedem.

- * *A. sericeus* Vent.
- A. shortii* Lindl.
- * *Brickellia eupatoriodes* (L.) Shinnery
- * *Cacalia atriplicifolia* L.
- !* *Cirsium altissimum* (L.) Spreng.
- * *Coreopsis palmata* Nutt.
- !* *C. tripteris* L.
- * *Echinacea pallida* Nutt.
- Erigeron philadelphicus* L.
- * *E. strigosus* Muhl.
- * *Eupatorium altissimum* L.
- E. rugosum* Houtt.
- * *Helianthus divaricatus* L.
- H. grosseserratus* Martens
- * *H. hirsutus* Raf.
- * *H. occidentalis* Riddell
- H. strumosus* L.
- Heliopsis helianthoides* (L.) Sweet
- Hieracium scabrum* Michx.
- !* *Lactuca canadensis* L.
- * *Liatris aspera* Michx.
- * *L. cylindracea* Michx.
- Prenanthes alba* L.
- !* *Ratibida pinnata* (Vent.) Barnh.
- * *Senecio plattensis* Nutt.
- * *Silphium integrifolium* Michx.
- Solidago caesia* L.
- S. flexicaulis* L.
- * *S. missouriensis* Nutt.
- * *S. nemoralis* Ait.
- * *S. rigida* L.
- S. ulmifolia* Muhl.
- * *Tragopogon dubius* Scop.
- Verbesina alternifolia* (L.) Britt.
- Vernonia baldwinii* Torr.
- V. gigantea* (Walt.) Trel.

BERBERIDACEAE

- Berberis thunbergii* DC
- Caulophyllum thalictroides* (L.) Michx.
- Podophyllum peltatum* L.

BORAGINACEAE

- * *Lithospermum canescens* (Michx.) Lehm.
- * *L. caroliniense* (J.F.Gmel.) MacM.

BRASSICACEAE

- Arabis canadensis* L.
- A. laevigata* (Muhl.) Poir.
- Dentaria lacinata* Muhl.

CAESALPINIACEAE

- !* *Cercis canadensis* L.
- !* *Gleditsia triacanthos* L.
- Gymnocladus dioica* (L.) K. Koch

CAMPANULACEAE

- Campanula americana* L.
- Triodanis perfoliata* (L.) Nieuwl.

CAPRIFOLIACEAE

- Viburnum rafinesquianum* Schultes
- V. trilobum* Marsh

CARYOPHYLLACEAE

- * *Scleranthus annuus* L.

CELASTRACEAE

- Celastrus scandens* L.

COMMELINACEAE

- Commelina communis* L.
- Tradescantia ohiensis* Raf.

CONVOLVULACEAE

- * *Calystegia spithamea* (L.) Pursh

CORYLACEAE

- Ostrya virginiana* (Mill.) K. Koch

CORNACEAE

- Cornus racemosa* Lam.

CUPRESSACEAE

- !* *Juniperus virginiana* L.

CYPERACEAE

- Carex albursina* Sheldon
- C. blanda* Dewey
- C. granularis* Willd.
- C. jamesii* Schwein.
- * *C. meadii* Dewey.
- C. muhlenbergii* Willd. var. *enervia* Boott
- C. pennsylvanica* Lam.
- * *C. tetanica* Schk.

DIOSCOREACEAE

- Dioscorea quaternata* (Walt.) J.F.Gmel.

EUPHORBIACEAE

- Acalypha rhomboidea* Raf.
- * *Euphorbia corollata* L.

FABACEAE

- * *Amorpha canescens* Pursh
- * *Baptisia lactea* (Raf.) Thieret
- * *B. leucophaea* Nutt.
- * *Dalea candida* (Michx.) Willd.
- * *D. purpurea* Vent.
- Desmondium canescens* (L.) DC
- D. glutinosum* (Muhl.) Wood
- D. nudiflorum* (L.) DC

!* *Lespedeza violacea* (L.) Pers.

L. virginica (L.) Britt.

Melilotus alba Medic.

* *Psoralea tenuiflora* Pursh

Robinia pseudoacacia L.

FAGACEAE

Quercus alba L.

Q. macrocarpa Michx.

!* *Q. prinoides* Willd. var. *acuminata* (Michx.) Gl.

Q. rubra L.

Q. velutina Lam.

GENTIANACEAE

* *Gentiana puberulenta* A. Davids

* *Gentianella quinquefolia* (L.) Small ssp. *occidentalis* (Gray) J. Gillet

GROSSULARIACEAE

Ribes missouriense Nutt.

HAMAMELIDACEAE

Hamamelis virginiana L.

HYDRANGEACEAE

Hydrangea arborescens L.

HYPERICACEAE

* *Hypericum sphaerocarpum* Michx.

IRIDACEAE

* *Sisyrinchium campestre* Bickn.

JUNCACEAE

Juncus tenuis Willd.

JUGLANDACEAE

Carya cordiformis (Wang.) K. Koch

C. ovata (Mill.) K. Koch

C. tomentosa (Poir.) Nutt.

Juglans nigra L.

LAMIACEAE

* *Monarda fistulosa* L.

Pycnanthemum pilosum Nutt.

* *Scutellaria leonardii* Epling

S. ovata Hill var. *versicolor* (Nutt.) Fern.

* *Teucrium canadense* L.

LAURACEAE

Sassafras albidum (Nutt.) Nees

LILIACEAE

!* *Asparagus officinalis* L.

* *Hypoxis hirsuta* (L.) Coville.

Polygonatum commutatum (Schult.) A. Dietr.

Smilicina racemosa (L.) Desf.

Trillium flexipes Raf.

T. nivale Riddell

T. recurvatum Beck.

Uvularia grandiflora Sm.

LINACEAE

- * *Linum sulcatum* Riddell

MENISPERMACEAE

- Menispermum canadense* L.

MORACEAE

- Morus rubra* L.

OLEACEAE

- !* *Fraxinus americana* L.

OPHIOGLOSSACEAE

- Botrychium virginianum* (L.) Sw.

ORCHIDACEAE

- * *Spiranthes cernua* (L.) Rich

OXALIDACEAE

- Oxalis stricta* L.

- !* *O. violacea* L.

OROBANCHACEAE

- Orobanche uniflora* L.

PAPAVERACEAE

- Dicentra cucullaria* (L.) Bernh.

- Sanguinaria canadensis* L.

PHYRMACEAE

- Phyrma leptostachya* L.

POACEAE

- Agrostis hyemalis* (Walt.) BSP

- * *Andropogon gerardi* Vitman

- * *Bouteloua curtipendula* (Michx.) Torr.

- Bromus purgans* L.

- B. tectorum* L.

- Danthonia spicata* (L.) Roem. & Schultes

- * *Dichanthelium acuminatum* (Sw.) Gould & Clark var. *fasciculatum* (Torr.) Freckm.

- D. latifolium* (L.) Gould & Clark

- * *D. liebergii* (Vasey) Freckm.

- D. oligosanthos* (Schult.) Gould

- D. villosissimum* (Nash) Freckm. var. *praecocius* (Hitchc. & Chase) Freckm.

- Elymus hystrix* L.

- Festuca obtusa* Biehler

- F. pratensis* Huds.

- Muhlenbergia sobolifera* (Muhl.) Trin.

- Poa nemoralis* L.

- P. pratensis* L.

- * *Schizachyrium scoparium* (Michx.) Nash

- * *Sorghastrum nutans* (L.) Nash

- * *Sporobolus heterolepis* (Gray) Gray

- Vulpia octoflora* (Walt.) Rydb. var. *glauca* (Nutt.) Fern.

POLEMONIACEAE

Phlox divaricata L. ssp. *laphamii* (Wood) Wherry

* *P. pilosa* L.

POLYGALACEAE

* *Polygala senega* L.

* *P. verticillata* L.

PORTULACACEAE

Claytonia virginica L.

PRIMULACEAE

* *Lysimachia ciliata* L.

PYROLACEAE

Monotropa hypopithys L.

RANUNCULACEAE

!* *Anemone cylindrica* Gray

A. virginiana L.

Hepatica nobilis Mill. var. *acuta* (Pursh) Steyerem.

* *Ranunculus hispidus* Michx.

RHAMNACEAE

* *Ceanothus americanus* L.

ROSACEAE

Agrimonia gryposepala Wallr.

Amelanchier arborea (Michx.f.) Fern.

Crataegus pruinosa (Wendl.) K. Koch

Fragaria virginiana Duchesne

Geum canadense Jacq.

!* *Malus ioensis* (Wood) Britt.

Potentilla simplex Michx.

Prunus serotina Ehrh.

!* *Rosa carolina* L.

Rubus allegheniensis Porter

R. enslenii Tratt.

R. frondosus Bigel.

R. occidentalis L.

RUBIACEAE

Galium aparine L.

G. circaezans Michx.

G. concinnum Torr. & Gray

G. triflorum Michx.

RUTACEAE

Ptelea trifoliata L.

Zanthoxylum americanum Mill.

SALICACEAE

Populus deltoides Marsh

!* *P. grandidentata* Michx.

SANTALACEAE

* *Comandra umbellata* (L.) Nutt.

SAXIFRAGACEAE

Heuchera richardsonii R. Br. var. *grayana* Rosend., Butt. & Lak.

SCROPHULARIACEAE

Agalinis skinneriana (Wood.) Britt.

* *Aureolaria grandiflora* (Benth.) Pennell var. *pulchra* Pennell

SMILACACEAE

Smilax ecirrhata Kunth.

S. hispida Muhl.

S. lasioneuron Hook.

SOLANACEAE

* *Physalis virginiana* Mill.

STAPHYLEACEAE

Staphylea trifolia L.

TILIACEAE

Tilia americana L.

ULMACEAE

Celtis occidentalis L.

Ulmus americana L.

U. rubra Muhl.

URTICACEAE

Urtica dioica L.

VIOLACEAE

Viola obliqua Hill

* *V. pedata* L.

V. pubescens Ait. var. *eriocarpa* (Schwein.) Russell

* *V. sororia* Willd.

VITACEAE

Parthenocissus quinquefolia (L.) Planch.

Vitis vulpina L.