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## Comparison of Field and Forest Floras in Monona County, Iowa

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COMPARISON OF FIELD AND FOREST FLORAS IN MONONA  
COUNTY, IOWA.

BY D. H. BOOT.

The purpose of this paper is to present some of the results obtained in a study made of the field and forest floras of St. Clair township, Monona county, which indicate the close relations existing between the floras of the most extreme types of plant habitat found in Iowa.

The locality selected is in the east central part of Monona county, which is at the west end of the middle tier of counties of the state of Iowa. The eastern part of this county is very heavily rolling, the clay hills consisting of wind-blown loess, with a rather thin vegetable mold for a top soil. Five areas were chosen for study. One of these was a high prairie ridge running east and west, with the south side exposed to the strong southwest winds of summer, and carrying only a scanty xerophytic prairie vegetation. The second station was on a low prairie point between two high ridges, and with a southeast exposure. This prairie point was well protected from the southwest winds, and, like the first one, had never been disturbed by the plow. The third station was a piece of cleared ground that was reverting to forest again. This tract was on the north side of a high hill, and well protected from the hot summer winds. The fourth station was in a dense forest on the south bank of a deep gulch running east and west, so that it has a north exposure. The fifth station was on the north bank of the same gulch and differed from the fourth only in having a south exposure. The studies made included observations on the soil evaporation, on the relative humidity, the wind movement, and numerous other items that may affect plant growth; but this paper deals only with the lists of plants taken at each point and their correlation.

The study was made in the fall of 1909 and the spring of 1910. Collections of all plants in bloom were made August 3, August 14, August 21, September 18, April 9, April 30, June 1, June 9, and June 16, at each of the five different stations. The plants taken at the first station on August 3 were *Cirsium discolor* (Muhl.) Spreng. (Common Thistle), *Petalostemum candidum* Michx., (Prairie Clover), *Amorpha canescens* Pursh. (Lead Plant), *Brauneria angustifolia* (DC.) Britton (Purple Cone-flower), *Potentilla arguta* Pursh. (Cinquefoil), *Euphorbia corollata* L. (Flowering Spurge), *Verbascum Thapsus* L. (Common

Mullein). No plants were blooming on this date at stations two or three; at station four *Desmodium grandiflorum* (Walt.) DC. (Tick Trefoil), *Phyrma leptostachya* L. (Lopseed), *Hystrix patula* Moench. (Bottlebush Grass), *Campanula americana* L. (Tall Bell-flower), *Geum virginianum* L. (Avens); and at station five *Desmodium grandiflorum* (Walt.) DC. (Tick Trefoil), *Campanula americana* L. (Tall Bell-flower), *Geum virginianum* L. (Avens), *Laportea canadensis* (L.) Gaud. (Wood Nettle), *Elymus striatus* Willd. (Wild Rye), *Chenopodium album* L. (Lambs' Quarters), were taken. August 14, the plants taken were *Amorpha canescens* Pursh. (Lead Plant), *Brauneria angustifolia* (DC.) Britton (Purple Cone-flower), *Euphorbia corrolata* L. (Flowering Spurge), *Polygonum convolvulus* L. (Black Bindweed), *Euphorbia preslii* Guss. (Spurge), *Dyssodia papposa* (Vent.) Hitchc. (Fetid Marigold), *Trifolium repens* L. (White Clover), *Salsola kali* var. *tenuifolia* G. F. W. Mey. (Russian Thistle), *Solidago nemoralis* Ait. (Goldenrod), *Polygonum pennsylvanicum* L. (Knotweed), *Asclepias verticillata* L. (Milkweed), *Petalostemum purpureum* (Vent.) Rydb. (Prairie Clover), *Linum sulcatum* Riddell (Flax), *Monarda mollis* L. (Horse Mint), *Verbena stricta* Vent. (Hoary Vervain), *Cirsium iowense* (Pammel) Fernald (Common Thistle), *Eragrostis megastachye* (Koeler) Link (A grass), *Houstonia angustifolia* Michx. (No common name), *Symphoricarpos occidentalis* Hook (Wolfberry), *Bouteloua curtipendula* (Michx.) Torr. (Mesquite Grass), *Andropogon furcatus* Muhl. (Beard Grass), for area No. 1. For area No. 2 there were taken *Cirsium discolor* (Muhl.) Spreng. (Common Thistle), *Petalostemum candidum* Michx. (Prairie Clover), *Euphorbia corrolata* L. (Flowering Spurge), *Euphorbia preslii* Guss. (Spurge), *Asclepias verticillata* L. (Milkweed), *Verbena stricta* Vent. (Hoary Vervain), *Petalostemum purpureum* (Vent.) Rydb. (Prairie Clover), *Linum sulcatum* Riddell (Flax), *Monarda mollis* L. (Horsemint), *Andropogon furcatus* Muhl. (Beard Grass), *Desmodium canescens* (L.) DC. (Tick Trefoil), *Helianthus tuberosus* L. (Jerusalem Artichoke), *Lactuca ludoviciana* (Nutt.) Riddell (Lettuce), *Symphoricarpos occidentalis* var. *laevigatus* Fernald (Snowberry), *Astragalus canadensis* L. (Milk Vetch), *Desmodium grandiflorum* (Walt.) DC. (Tick Trefoil). Area No. 3 was represented by *Monarda mollis* L. (Horse Mint), *Helianthus tuberosus* L. (Jerusalem Artichoke), *Polygonum lapathifolium* L. (Knotweed), *Impatiens pallida* Nutt. (Pale Touch-me-not), *Amphicarpa pitcheri* T. and G. (Hog Peanut), *Scrophularia leporella* Bicknell (Figwort), *Verbena urticaefolia* L. (White vervain). From area No. 4 were taken *Eupatorium urticaefolium* Reichard (White Snakeroot), *Phyrma leptostachya* L. (Lopseed),

*Campanula americana* L. (Tall Bell-flower), *Geum virginianum* L. (Avens), *Lappula virginiana* (L.) Greene (Beggars' Lice), *Circaea lutetiana* L. (Enchanter's Nightshade), *Eupatorium purpureum* L. (Joe-pye Weed), *Laportea canadensis* (L.) Gaud. (Wood Nettle). From area No. 5 *Phryma leptostachya* L. (Lopseed), *Campanula americana* L. (Tall Bellflower), *Geum virginianum* L. (Avens), *Agrimonia mollis* (T. and G.) Britton (Agrimony), *Desmodium dillenii* Darl. (Tick Trefoil). The plants collected on the 21st of August were: for area No. 1, *Cirsium discolor* (Muhl.) Spreng. (Common Thistle), *Amorpha canescens* Pursh. (Lead Plant), *Euphorbia corrolata* L. (Flowering Spurge), *Euphorbia preslii* Guss. (Spurge), *Dyssodia papposa* (Vent.) Hitchc. (Fetid Marigold), *Solidago nemoralis* Ait. (Goldenrod), *Asclepias verticillata* L. (Milkweed), *Petalostemum purpureum* (Vent.) Rydb. (Prairie Clover), *Monarda mollis* L. (Horsemint), *Verbena stricta* Vent. (Hoary Vervain), *Houstonia angustifolia* Michx. (No common name), *Bouteloua curtipendula* (Michx.) Torr. (Mesquite Grass), *Andropogon scoparius* Michx. (Beard Grass); for area No. 2, *Euphorbia corrolata* L. (Flowering Spurge), *Euphorbia preslii* Guss. (Spurge), *Asclepias verticillata* L. (Milkweed), *Petalostemum purpureum* (Vent.) Rydb. (Prairie Clover), *Linum sulcatum* Riddell (Flax), *Monarda mollis* L. (Horsemint), *Verbena stricta* Vent. (Hoary Vervain), *Andropogon furcatus* Muhl. (Beard Grass), *Andropogon scoparius* Michx. (Beard Grass), *Sorghastum nutans* (L.) Nash. (Indian Grass), *Astragalus canadensis* L. (Milk Vetch), *Oenothera biennis* L. (Common Evening Primrose), *Verbena hastata* L. (Blue Vervain), *Helianthus hirsutus* Raf. (Sunflower), *Solidago serotina* Ait. (Goldenrod); for area No. 3, *Cirsium discolor* (Muhl.) Spreng. (Common Thistle), *Monarda mollis* L. (Horsemint), *Eragrostis megastachya* (Koeler) Link (A Grass), *Andropogon furcatus* Muhl. (Beard Grass), *Bidens vulgata* Greene (Beggar-ticks), *Oenothera biennis* L. (Common Evening Primrose), *Verbena hastata* L. (Blue Vervain), *Helianthus hirsutus* Raf. (Sunflower), *Heliopsis helianthoides* (L.) Sweet. (Ox-eye), *Polygonum lapathifolium* L. (Knotweed), *Amphicarpa pitcheri* T. and G. (Hog Peanut), *Verbena urticaefolia* L. (White Vervain), *Potentilla monspeliensis* L. (Cinquefoil), *Erigeron canadensis* L. (Horseweed), *Ambrosia artemisiifolia* L. (Roman Wormwood), *Panicum capillare* L. (Old Witch Grass), *Polygonum dumetorium* L. (Knotweed), *Scrophularia marilandica* L. (Figwort); for area No. 4, *Campanula americana* L. (Tall Bell-flower), *Ambrosia trifida* var. *integrifolia* (Muhl.) T. and G. (Great Ragweed), *Lactuca floridana* (L.) Gaertn. (Lettuce), *Impatiens pallida* Nutt. (Pale Touch-me-not); for area No. 5, *Euphorbia corrolata* L.

(Flowering Spurge), *Salsola kali* var. *tenuifolia* G. F. W. Mey. (Russian Thistle), *Andropogon furcatus* Muhl. (Beard Grass), *Kuhnia eupatorioides* var. *corymbulosa* T. and G. (False Boneset), *Eupatorium urticaefolium* Reichard (White Snakeroot), *Phryma leptostachya* L. (Lopseed), *Campanula americana* L. (Tall Bell-flower), *Laportea canadensis* (L.) Gaud. (Woodnettle), *Desmodium dillenii* Darl. (Tick Trefoil). On the 18th of September the following plants were collected: Area No. 1, *Cirsium discolor* (Muhl.) Spreng. (Common Thistle), *Euphorbia corollata* L. (Flowering Spurge), *Dyssodia papposa* (Vent.) Hitchc. (Fetid Marigold), *Solidago nemoralis* Ait. (Goldenrod), *Linum sulcatum* Riddell (Flax), *Kuhnia eupatorioides* var. *corymbulosa* T. and G., *Aster sericeus* Vent. (Aster), *Solidago rigida* L. (Goldenrod), *Sorghastum nutans* (L.) Nash. (Indian Grass), *Aster multifloris* var. *exiguus* Fernald (Aster), *Bidens vulgata* Greene (Beggar Ticks); area No. 2, *Euphorbia corollata* L. (Flowering Spurge), *Kuhnia eupatorioides* var. *corymbulosa* T. and G., *Heliopsis helianthoides* (L.) Sweet. (Ox-eye), *Aster cordifolius* L. (Aster); area No. 3, *Monarda mollis* L. (Horsemint), *Helianthus tuberosus* L. (Jerusalem Artichoke), *Helianthus hirsutus* Raf. (Sunflower), *Polygonum lapathifolium* L. (Knotweed), *Impatiens pallida* Nutt. (Pale Touch-me-not), *Eupatorium urticaefolium* Reichard (White Snakeroot); area No. 4, *Eupatorium urticaefolium* Reichard (White Snakeroot), *Campanula americana* L. (Tall Bellflower); area No. 5, *Aster cordifolius* L. (Aster). In the following spring the lists of plants collected are: for April 9, area No. 1, *Astragalus caryocarpus* Ker. (Ground Plum), *Erythronium albidum* Nutt. (White Dog's-tooth Violet), *Viola sororia* Willd. (Violet), *Ostrya virginiana* (Mill.) K. Koch. (American Hop Hornbean), *Anemone patens* var. *wolfgangiana* (Bess.) Koch. (Pasque Flower), *Carex pennsylvanica* Lam. (Sedge), *Viola pedatifida* G. Dou. (Violet), *Antennaria neodioica* Greene (Everlasting), *Quercus macrocarpa* var. *oliviformis* (Michx. f.) Gray (Bur Oak); area No. 2, *Erythronium albidum* Nutt. (White Dog's-tooth Violet), *Taraxacum officinale* Weber (Dandelion); area No. 3, *Erythronium albidum* Nutt. (White Dog's-tooth Violet), *Taraxacum officinale* Weber (Dandelion), *Ribes gracile* Michx. (Missouri Gooseberry), *Prunus americana* Marsh. (Wild Plum), *Crataegus mollis* (T. and G.) Scheele. (Hawthorn), *Viola scabriuscula* Schwein. (Smooth Yellow Violet); area No. 4, *Carex pennsylvanica* Lam. (Sedge), *Taraxacum officinale* Weber (Dandelion), *Sisyrinchium campestre* Bicknell (Blue-eyed Grass), *Viola scabriuscula* Schwein. (Smooth Yellow Violet); *Phlox divaricata* L. (Blue Phlox), *Arisaema triphyllum* (L.) Schott (Indian Turnip), *Ranunculus abortivus* L. (Small-flowered Crowfoot),

*Dicentra cucullaria* (L.) Bernh. (Dutchman's Breeches), *Ribes cynosbati* L. (Prickly Gooseberry), *Sanguinaria canadensis* L. (Bloodroot); area No. 5; *Erythronium albidum* Nutt. (White Dog's-tooth Violet), *Viola sororia* Willd. (Violet), *Ribes gracile* Michx. (Missouri Gooseberry), *Prunus americana* Marsh. (Wild Plum), *Phlox divaricata* L. (Blue Phlox), *Quercus macrocarpa* Michx. (Bur Oak). The plants collected on the 30th of April on area No. 1 were *Carex pennsylvanica* Lam. (Sedge), *Antennaria neodioica* Greene (Everlasting), *Lithospermum angustifolium* Michx. (Puccoon). For area No. 2 they were *Sisyrinchium campestre* Bicknell, (Blue-eyed Grass). For area No. 3 none were taken. For area No. 4, *Viola pubescens* Ait. (Downy Yellow Violet), *Galium aperina* L. (Cleavers), *Fragaria virginiana* Duchesne. (Strawberry) were collected. For area No. 5 the list included *Viola scabriuscula* Schwein. (Smooth Yellow Violet), *Phlox divaricata* L. (Blue Phlox), *Arisaema triphyllum* (L.) Schott (Indian Turnip), *Ranunculus abortivus* L. (Small-flowered Crowfoot), *Galium aperina* L. (Cleavers), *Osmorhiza longistylus* var. *villicaulis* Fernald. (Sweet Cicely). The plants collected on the 1st of June were: Area No. 1, *Poa pratensis* L. (Kentucky Blue Grass), *Ceanothus ovatus* var. *pubescens* T. and G. (Redroot); area No. 2, *Poa compressa* L. (Canada Blue Grass), *Tradescantia bracteata* Small (Spiderwort); area No. 3, *Trifolium repens* L. (White Clover), *Aquilegia canadensis* L. (Wild Columbine), *Phlox divaricata* L. (Blue Phlox), *Carya glabra* (Mill.) Sprach. (Pignut), *Arisaema triphyllum* (L.) Schott (Indian Turnip), *Sanicula canadensis* L. (Sanicle), *Ranunculus abortivus* L. (Small-flowered Crowfoot), *Delphinium tricorne* Michx. (Dwarf Larkspur), *Fragaria vesca* var. *americana* Porter (Strawberry); area No. 4, *Taraxacum officinale* Weber (Dandelion), *Phlox divaricata* L. (Blue Phlox), *Arisaema triphyllum* (L.) Schott (Indian Turnip), *Ranunculus abortivus* L. (Small-flowered Crowfoot), *Hydrophyllum virginianum* L. (Waterleaf), *Sanicula marilandica* L. (Black Snakeroot), *Galium aperina* L. (Cleavers); for area No. 5, *Taraxacum officinale* Weber (Dandelion), *Aquilegia canadensis* L. (Wild Columbine), *Phlox divaricata* L. (Blue Phlox), *Arisaema triphyllum* (L.) Schott (Indian Turnip), *Ranunculus abortivus* L. (Small-flowered Crowfoot), *Hydrophyllum virginianum* L. (Waterleaf), *Galium aperina* L. (Cleavers). For June 9 on area No. 1 the plants were *Ceanothus ovatus* var. *pubescens* T. and G. (Redroot), *Oxalis stricta* L. (Wood Sorrel); on area No. 2, *Oxalis stricta* L. (Wood Sorrel); for area No. 3, *Trifolium repens* L. (White Clover), *Poa pratensis* L. (Kentucky Blue Grass), *Taraxacum officinale* Weber (Dandelion), *Aquilegia canadensis* L. (Wild Columbine),

*Arisaema triphyllum* (L.) Schott (Indian Turnip), *Delphinium tricorne* Michx. (Dwarf Larkspur), *Hydrophyllum virginianum* L. (Waterleaf), *Aquilegia canadensis* L. (Wild Columbine); for area No. 4, none; for area No. 5, *Aquilegia canadensis* L. (Wild Columbine), *Carya glabra* (Mill.) Sprach. (Pignut), *Hydrophyllum virginianum* L. (Waterleaf), *Sanicula marilandica* L. (Black Snakeroot), *Galium aperina* L. (Cleavers), *Carya glabra* var. *villosa* (Sarg.) Robinson (Broom Hickory). The plants taken on June 16 are: for area No. 1, *Brauneria angustifolia* (DC.) Heller, (Purple Cone-flower), *Aster multiflorus* var. *exogenus* Fernald (Aster), *Ceanothus ovatus* var. *pubescens* T. and G. (Redroot), *Rosa pratincola* Greene (Rose), *Capsella bursa-pastoris* (L.) Medic. (Shepherd's Purse), *Physalis pubescens* L. (Ground Cherry), *Onosmodium occidentale* Mackenzie (False Gromwell), *Anemone cylindrica* Gray (Anemone); for area No. 2, *Physalis pubescens* L. (Ground Cherry), *Anemone cylindrica* Gray (Anemone), *Triosteum perfoliatum* L. (Tinker's Weed), *Trifolium hybridum* L. (Alsike Clover), *Achillea millefolium* L. (Common Yarrow); for area No. 3, *Trifolium repens* L. (White Clover), *Aquilegia canadensis* L. (Wild Columbine), *Cryptotaenia canadensis* (L.) DC. (Honewort), *Evonymus atropurpureus* Jacq. (Burning Bush), *Vitis velutina* L. (Riverbank Grape), *Sanicula marilandica* L. (Black Snakeroot), *Juglans nigra* L. (Black Walnut); for area No. 4, *Trifolium repens* L. (White Clover), *Phlox divaricata* L. (Blue Phlox), *Hydrophyllum virginianum* L. (Waterleaf), *Cryptotaenia canadensis* (L.) DC. (Honewort), *Evonymus atropurpureus* Jacq. (Burning Bush), *Sanicula marilandica* L. (Black Snakeroot), *Vitis vulpina* L. (Riverbank Grape); for area No. 5, *Hydrophyllum virginianum* L. (Waterleaf), *Cryptotaenia canadensis* (L.) DC. (Honewort), *Celastrus scandens* L. (Climbing Bittersweet).

By grouping these plants under their several areas and dates there is obtained a gradual curve of transition indicated by the plant names, extending regularly from area No. 1 to area No. 5, and indicating gradual change in flora from the one locality to the next, so that we have no abrupt changes from the high dry prairie ridge to the low sheltered prairies, from the low sheltered prairie to the cleared land, from the cleared land to the dense forest with a north exposure, nor from this to the dense forest with the south exposure, but there is a gradual transition from the plant life of one area to that of the next, until finally in the dense forest we have few of the plants found out on the exposed prairies.

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