

SPECIES COMPOSITION OF OLD SETTLER SILT-LOAM PRAIRIES

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Abstract. Over the course of a decade, studies were conducted throughout northern Illinois and northeastern Indiana to locate old settler cemeteries containing prairie vegetation and to determine their species composition. Of the 824 cemeteries investigated in 42 counties in northern Illinois and in 20 counties in northwestern Indiana, 150 contained some prairie species. Of the 44 cemeteries that had sufficient prairie species to warrant study, 29 were silt-loam prairies, 14 were sand and silt-loam savannas, and one was a sand prairie. A total of 180 species of prairie plants were found in the 29 silt-loam cemetery prairies, belonging to 43 different families. The Compositae had the most representatives with 48 species (26%), followed by Gramineae with 15 (8%), Cyperaceae with 14 species (7%), and the Leguminosae had 12 (6%) species. The soils present in these cemeteries had deep A-horizons, and most showed no evidence of ever having been plowed. They represent a cross-section of the soil types found in northern Illinois and northwestern Indiana, with loess soils in the west and till soils in the east. This difference in soil type influences the relative abundance of some prairie species.

Key Words. cemetery prairies, eastern prairie, tallgrass prairie, old settler cemeteries, Illinois, Indiana

INTRODUCTION

Although the Illinois tallgrass prairie is known through historical accounts, its species composition is not well documented. Most of the early reports (Short 1845) were of a general nature, with such vague names as "goldenrods, asters, etc." Some information about the prairie's composition can be gleaned from the annotated plant list of Mead (1846) and Brendel (1887). In this century, Gleason (1910) studied the composition of the Illinois sand prairies, Gates (1912) the sand prairies of the beach area in northeastern Illinois, Evers (1955) the hill prairies along the Mississippi River, and Fell and Fell (1956) studied the hill prairies along the Rock River in northern Illinois. Both Vestal (1914) and Sampson (1921) reported on the heavier silt-loam prairies of northern Illinois, and Betz and Cole (1969) recorded the vegetational changes which occurred on a "black-soil" prairie originally studied by Paintin (1928).

Even though many ecological texts mention that remnant prairies are to be found in old settler cemeteries, they are described in relatively few papers. Lantz (1969) and Morrissey (1956) reported on the species composition of two different cemetery prairies in Iowa, and cemetery prairies were used in studies by Fay (1953) in Iowa and by Penalosa (1963) in California. Wright and Wright (1948) used these old settler cemeteries as a source of data to study the ecological relationships existing between the Palouse and Mixed-Grass prairies in south central Montana.

Since August 1961, when one of the authors accidentally found an old cemetery prairie in northern Will County, an extended search in the Chicago area began to disclose more. Since that time, especially during the 1970s, the organized searches were conducted to find cemetery prairies in northern Illinois and northwestern Indiana.

METHODS

General highway maps, prepared by the Illinois Department of Public Works and Buildings, cover individual counties and show the locations of cemeteries. Using these maps, visits were made initially to all cemeteries in a given area. However, it soon became evident that many of the cemeteries had originally been in wooded

areas and did not have the potential to contain surviving prairie vegetation. Based on this consideration, it was decided to restrict exploratory visits to cemeteries which originally had been placed on the prairie or in the prairie-forest transition. Thus, it was necessary to learn the soil type or types of a cemetery to determine if it should be inspected. Accordingly, soil reports and maps, prepared by the Agricultural Experiment Station of the University of Illinois in cooperation with the Soil Conservation Service of the U. S. Department of Agriculture, were used for this purpose. Only cemeteries having soil types characteristic of prairie or prairie-forest transition were selected for exploratory visits, and the number of cemeteries designated for study was reduced substantially.

In each cemetery, certain prairie indicator species were sought, especially the warm-season grasses, such as big bluestem (*Andropogon gerardii* Vitman) and indiagrass [*Sorghastrum nutans* (L.) Nash]. These grasses often persisted around tombstones and in fence rows, even in those cemeteries which had been heavily mowed. In many cases the entire cemetery was still prairie. In others, prairie vegetation was to be found only in relatively undisturbed sections, such as areas in the front, the rear, and the sides. Those that were being regularly mowed were checked for depauperate prairie plants, such as lead plant (*Amorpha canescens* Pursh), wild bergamot (*Monarda fistulosa* L.) and yellow coneflower [*Ratibida pinnata* (Vent) Barnh.]. These sometimes were found surviving the mowing within the Kentucky bluegrass (*Poa pratensis* L.) turf. Efforts were made to urge the cemetery boards to cease mowing, so that enhanced growth would better permit the determination of the species composition still found within the cemeteries.

Vascular plants were identified and recorded at the time the cemeteries were initially evaluated. If the cemetery contained a substantial array of prairie vegetation as shown by the presence of at least 30 prairie species, a more intensive study was conducted. This necessitated revisiting the cemetery prairie at various times throughout the growing season for two or more years. Several cemetery prairies were visited more than a dozen times in order to catalog all the species. Nomenclature follows Fernald (1950) and is in conformity with that used by Swink and Wilhelm (1979). In addition to recording the species present, soil samples were taken to determine the depth of the A-horizon and to note other soil characteristics.

RESULTS

Of the 824 cemeteries in 42 counties of northern Illinois and in 20 counties in northwestern Indiana, 150 contained some prairie species. Of the 44 cemeteries that were deemed worthy of further study by having at least 30 prairie species, 29 were silt-loam prairies, one was a sand prairie, and 14 were silt-loam and sand savannas. Only the 29 silt-loam cemetery prairies are discussed in this paper.

The 180 species of prairie plants found in these silt-loam cemetery prairies belong to 43 different families (Table 1). The Compositae had the most representatives with 48 species (26%), followed by Gramineae with 15 (8%), Cyperaceae 14 (7%), and Leguminosae 12 (6%). These percentages generally correspond to the percentages reported by Curtis (1959) for the mesic prairies of

Table 1. Species composition of Illinois-Indiana silt-loam cemetery prairies.

Species	Cemetery Prairie ¹																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	Total
<i>Agoseris cuspidata</i> ²																													X	1
<i>Allium canadense</i>																		X	X	X	X	X	X	X		X	X			9
<i>Amorpha canescens</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	28
<i>Andropogon gerardii</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	29
<i>Andropogon scoparius</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	29
<i>Androsace occidentalis</i>									X																					1
<i>Anemone canadensis</i>									X						X															2
<i>Anemone cylindrica</i>							X	X				X	X		X	X			X	X	X				X	X	X			12
<i>Anemone patens</i> wolf.																											X			1
<i>Anemone virginiana</i>		X													X	X														3
<i>Antennaria neglecta</i>	X	X	X		X				X		X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	21
<i>Antennaria plantaginifolia</i>	X	X	X									X			X			X		X				X		X				9
<i>Apios americana</i>									X	X																				2
<i>Apocynum cannabinum</i>														X						X										2
<i>Apocynum sibiricum</i>	X		X			X	X			X		X		X		X		X		X	X	X	X			X	X			15
<i>Asclepias amplexicaulis</i>	X									X																				2
<i>Asclepias sullivantii</i>															X			X	X	X	X	X	X	X						7
<i>Asclepias tuberosa</i>		X			X				X						X						X				X		X			6
<i>Asclepias verticillata</i>	X	X	X	X	X	X		X		X	X	X	X		X	X		X	X	X	X	X	X	X	X		X	X	X	23
<i>Asclepias viridiflora</i>	X	X	X	X						X	X	X	X		X	X		X	X	X	X	X	X		X		X	X	X	17
<i>Aster azureus</i>	X	X	X	X	X	X		X		X	X	X		X	X		X	X	X	X	X				X	X	X			18
<i>Aster ericoides</i>	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	26
<i>Aster laevis</i>		X				X	X	X		X	X	X		X	X	X		X	X	X	X	X		X		X	X			16
<i>Aster linariifolius</i>																												X		1
<i>Aster novae-angliae</i>						X				X				X	X	X						X	X	X	X					9
<i>Aster ptarmicoides</i>																											X			1
<i>Aster sericeus</i>															X													X		2
<i>Aster simplex</i>				X				X							X								X							4
<i>Astragalus canadensis</i>					X		X		X			X								X										5
<i>Baptisia leucantha</i>																						X	X							2
<i>Baptisia leucophaea</i>			X			X	X		X					X	X	X				X		X	X		X	X				12
<i>Blephilia ciliata</i>																						X								1
<i>Bouteloua curtipendula</i>																										X	X	X		3
<i>Cacalia tuberosa</i>		X																					X							2
<i>Calamagrostis canadensis</i>		X									X	X	X	X								X								6
<i>Carex bicknellii</i>	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X			25
<i>Carex brevior</i>					X																									1
<i>Carex cephaloidea</i>							X																							1
<i>Carex conoidea</i>													X																	1
<i>Carex cristatella</i>																						X	X							2
<i>Carex gravida</i>																							X							1
<i>Carex meadii</i>		X				X									X							X								4
<i>Carex pennsylvanica</i>	X			X	X		X	X		X	X		X	X	X	X	X	X	X	X	X			X		X	X			16
<i>Carex stipata</i>																			X		X	X								3
<i>Carex stricta</i>														X			X													2
<i>Carex tetanica</i>																														3
<i>Carex vulpinoidea</i>															X							X	X							3
<i>Cassia fasciculata</i>																				X			X							2
<i>Ceanothus americanus</i>	X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X				X	X			18
<i>Cirsium discolor</i>		X																		X		X								3
<i>Cirsium hillii</i>	X	X		X	X	X			X		X		X	X	X		X	X		X	X			X	X					14
<i>Claytonia virginica</i>																			X						X	X				1
<i>Comandra richardiana</i>	X		X			X	X	X	X		X		X	X	X	X	X		X	X		X			X		X			17
<i>Convolvulus sepium</i>								X																						1
<i>Coreopsis palmata</i>		X			X		X	X						X	X		X		X	X	X	X			X	X	X			14
<i>Coreopsis tripteris</i>															X				X		X	X			X					5
<i>Desmodium canadense</i>		X			X		X		X	X	X	X	X	X	X				X			X	X							13
<i>Desmodium canescens</i>																													X	1
<i>Desmodium illinoense</i>		X	X		X	X	X			X	X		X	X		X		X	X		X	X	X			X	X	X		18
<i>Dodecatheon meadia</i>	X			X				X	X				X	X		X	X	X	X	X	X		X		X	X	X	X		15

Table 2. Total number of species and size (ha) of Illinois-Indiana silt-loam cemetery prairies.

Type of silt-loam and location	Number of species	Area
	-- number --	-- ha --
A. Tama Silt-Loam		
1. Bureau #1 (Hetzler)	52	0.4
2. Henry #1 (Munson)	71	2.0
3. Henry #2 (Hoose)	47	0.4
4. Lee #1 (Temperance Hill)	53	0.4
5. Lee #2 (DeWolf)	45	0.2
6. Mercer #1 (Brownlee)	65	0.8
7. Putman #1 (Mt. Palatine)	54	0.8
8. Warren #1 (Spring Grove)	56	0.4
9. Whiteside #1 (Clyde)	60	0.4
10. Whiteside #2 (Heaton)	58	0.3
B. Catlin Silt-Loam		
11. Champaign #1 (Jessee)	36	0.4
12. LaSalle #1 (Four-Mile Grove)	54	0.4
13. LaSalle #2 (St. Clara)	47	0.8
C. Saybrook Silt-Loam		
14. DeKalb #1 (Afton)	66	1.2
15. Marshall #1 (Camp Grove)	49	0.4
16. Will #1 (Vermont)	70	0.4
D. Elliott Silt-Loam		
17. Ford #1 (Prospect)	84	2.0
18. DuPage #1 (Stephen's)	62	0.3
19. Livingston #4 (Broughton)	70	0.9
20. McLean #1 (Weston)	77	2.0
E. Clarence Silt-Loam		
21. Livingston #1 (Sunbury)	86	0.4
22. Vermilion #1 (Pellville)	70	0.4
F. Swygert Silt-Loam		
23. Iroquois #1 (Pine Ridge)	89	1.4
24. Livingston #2 (Nevada)	49	1.2
25. Livingston #5 (Sullivan)	41	0.4
G. Parr Silt-Loam		
26. Lake-Ind #1 (German Methodist)	66	0.4
H. Dry Prairies		
27. McHenry #1 (Queen Anne)	49	0.4
28. Ogle #1 (Beach)	63	0.8
29. Tiptecanoe-Ind #1 (Granville)	30	0.4

us Lindl.) than do the till soils. On the other hand, species such as alum root (*Heuchera richardsonii* R. Br.), Culver's root [*Veronicastrum virginicum* (L.) Farw.], and smooth blue aster (*Aster laevis* L.) usually sustain higher populations on the wetter, more poorly drained till soils of eastern Illinois and western Indiana.

In most of these cemetery prairies the depth of the A-horizon averages 36 to 48 cm and showed no evidence of ever having been plowed. However, it is possible that two of these cemetery prairies, the Hoose Cemetery (Henry #2) and the Heaton Cemetery (Whiteside #2) may have been subjected to some plowing, based on shallower A-horizons. Sunbury (Livingston #1) also had a somewhat shallower A-horizon, but the richness of species present suggested that it had not been plowed. The somewhat shallow-A horizon may have been the consequence of the sloping surface of the section where the prairie survived. Nevada Cemetery (Livingston #2) lacked certain species, such as lead plant, prairie compass plant (*Silphium laciniatum* L.), and prairie clovers (*Petalostemum* spp.), suggesting that there was an early history of plowing prior to the establishment of the cemetery. The earliest tombstone, dating from the 1880s, would have made possible the

cropping of the area before the cemetery was established. In contrast, the other cemeteries dated from the 1840s and 1850s. This possible earlier period of plowing for the Nevada Cemetery would appear, however, to have been of short duration, based on the fact that the soil A-horizon is 36 to 42 cm deep and not appreciably eroded.

Some geographical differences were noted in the distribution of certain species. For example, prairie smoke (*Geum triflorum* Pursh) was found only in the more northern cemetery prairies, and long-leaved bluets (*Houstonia longifolia* Gaertn.) had a more southerly distribution.

Although these cemetery prairies are small in size (Table 2), they are perhaps the best surviving remnants of the mesic to dry-mesic pre-settlement Illinois-Indiana prairie. However, since these cemetery prairies are essentially terrestrial islands with their isolation and small populations, extinction of some species and genetic drift will occur (MacArthur and Wilson 1967). Even with adequate protection and good management, these cemetery prairies will slowly degrade without the continual introduction of new genetic material. These cemetery prairies still possess a valuable array of species which can be used in evaluating current restorations of Illinois and Indiana prairies. Further, the unplowed soils provide a measure of the extent to which erosion has taken its toll in the surrounding fields. Ten of these cemetery prairies have been designated as nature preserves by Illinois and Indiana. With their charm and beauty, these cemetery prairie remnants give a small glimpse of what the settlers of the pre-settlement Illinois-Indiana prairies first saw when they entered this region.

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Table 3. Soils of the Illinois-Indiana silt-loam cemetery prairies.

Type of silt-loam and location	Depth of A-horizon	Thickness of loess	Type of till
	----- cm -----	----- m -----	
A. Tama Silt-Loam			
1. Bureau #1 (Hetzler)	32-35	> 1.5	none
2. Henry #1 (Munson)	25-27	> 1.5	none
3. Henry #2 (Hoose)	20-22	> 1.5	none
4. Lee #1 (Temperance Hill)	42-45	> 1.5	none
5. Lee #2 (DeWolf)	37-40	> 1.5	none
6. Mercer #1 (Brownlee)	40-42	> 1.5	none
7. Putnam #1 (Mt. Palatine)	40-42	> 1.5	none
8. Warren #1 (Spring Grove)	37-40	> 1.5	none
9. Whiteside #1 (Clyde)	32-35	> 1.5	none
10. Whiteside #2 (Heaton)	12-17	> 1.5	none
B. Catlin Silt-Loam			
11. Champaign #1 (Jessee)	35-40	0.9-1.5	none
12. LaSalle #1 (Four-Mile Grove)	35-40	0.9-1.5	none
13. LaSalle #2 (St. Clara)	35-40	0.9-1.5	none
C. Saybrook Silt-Loam			
14. DeKalb #1 (Afton)	25-27	0.45-0.9	loam
15. Marshall #1 (Camp Grove)	37-40	0.45-0.9	loam
16. Will #1 (Vermont)	35-40	0.45-0.9	loam
D. Elliott Silt-Loam			
17. Ford #1 (Prospect)	40-45	0.45-0.9	silty clay loam
18. DuPage #1 (St. Stephen's)	35-40	0.45-0.9	silty clay loam
19. Livingston #4 (Broughton)	40-42	0.45-0.9	silty clay loam
20. McLean #1 (Weston)	40-45	0.45-0.9	silty clay loam
E. Clarence Silt-Loam			
21. Livingston #1 (Sunbury)	20-22	0.45-0.9	clay drift
22. Vermilion #1 (Pellville)	35-40	0.45-0.9	clay drift
F. Swygert Silt-Loam			
23. Iroquois #1 (Pine Ridge)	40-45	0.45-0.9	calcareous clay
24. Livingston #2 (Nevada)	40-42	0.45-0.9	calcareous clay
25. Livingston #5 (Sullivan)	40-45	0.45-0.9	calcareous clay
G. Parr Silt-Loam			
26. Lake-Ind #1 (German Methodist)	30-32	< 0.45	loam
H. Dry Prairies (Various Soils)			
27. McHenry #1 (Queen Anne)	32-35	-----	sandy loam
28. Ogle #1 (Beach)	-----	-----	gravel
29. Tippecanoe-Ind #1 (Granville)	30-35	-----	none

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