

Forest and Prairie in Three Northwestern Indiana Counties

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The *Butler University Botanical Studies* journal was published by the Botany Department of Butler University, Indianapolis, Indiana, from 1929 to 1964. The scientific journal featured original papers primarily on plant ecology, taxonomy, and microbiology. The papers contain valuable historical studies, especially floristic surveys that document Indiana's vegetation in past decades. Authors were Butler faculty, current and former master's degree students and undergraduates, and other Indiana botanists. The journal was started by Stanley Cain, noted conservation biologist, and edited through most of its years of production by Ray C. Friesner, Butler's first botanist and founder of the department in 1919. The journal was distributed to learned societies and libraries through exchange.

During the years of the journal's publication, the Butler University Botany Department had an active program of research and student training. 201 bachelor's degrees and 75 master's degrees in Botany were conferred during this period. Thirty-five of these graduates went on to earn doctorates at other institutions.

The Botany Department attracted many notable faculty members and students. Distinguished faculty, in addition to Cain and Friesner, included John E. Potzger, a forest ecologist and palynologist, Willard Nelson Clute, co-founder of the American Fern Society, Marion T. Hall, former director of the Morton Arboretum, C. Mervin Palmer, Rex Webster, and John Pelton. Some of the former undergraduate and master's students who made active contributions to the fields of botany and ecology include Dwight W. Billings, Fay Kenoyer Daily, William A. Daily, Rexford Daudenmire, Francis Hueber, Frank McCormick, Scott McCoy, Robert Petty, Potzger, Helene Starcs, and Theodore Sperry. Cain, Daubenmire, Potzger, and Billings served as Presidents of the Ecological Society of America.

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FOREST AND PRAIRIE IN THREE NORTH-WESTERN INDIANA COUNTIES*

By FRED W. ROHR AND J. E. POTZGER

The modifying influence of civilized man on natural vegetation is so rapid and so extensive that it becomes a difficult problem after a century or more to picture the original vegetation cover. The task is still more difficult when one attempts to express the vegetation in quantitative terms. Today the taxonomists scour the railway right-of-way for specimens of prairie plants for the prairie itself with its plant sociology has vanished. We will never be able adequately to reconstruct this vegetation complex, and we can only with difficulty draw its former boundary. Even though the surveyors of the original United States land survey, whose records form the basis of this study, made copious notes on prairie areas, it is likely that sedge-meadow type of vegetation was included under their classification of "wet prairie." If the term actually described areas dominated by typical prairie grasses, then Indiana at that time had wet prairie, dry prairie and a transition type of prairie and forest association, park-like in nature, which might be called oak openings.

In the absence of trees to bear witness of corners, the surveyors placed posts. This system outlines treeless areas very definitely, and the ecotone condition, where prairie and forest compete, is shown by reduced abundance of stems listed for a given township and by the frequent use of posts as witness markers. In typical forested counties in Indiana the number of stems recorded is usually three times as great as in Lake, Newton and Jasper counties.

METHODS

Data were taken from the records of the original United States land survey in Lake, Newton and Jasper counties. The adjoining southernmost four prairie counties will be considered in another paper.

* This is publication 238 of the Botanical Laboratory of Butler University. We express our thanks to Mrs. Margaret Esther Potzger for the lettering on figure 1. The senior author expresses his appreciation to Butler University for a Butler Faculty Fellowship which aided in the series of studies dealing with the original vegetation of Indiana.

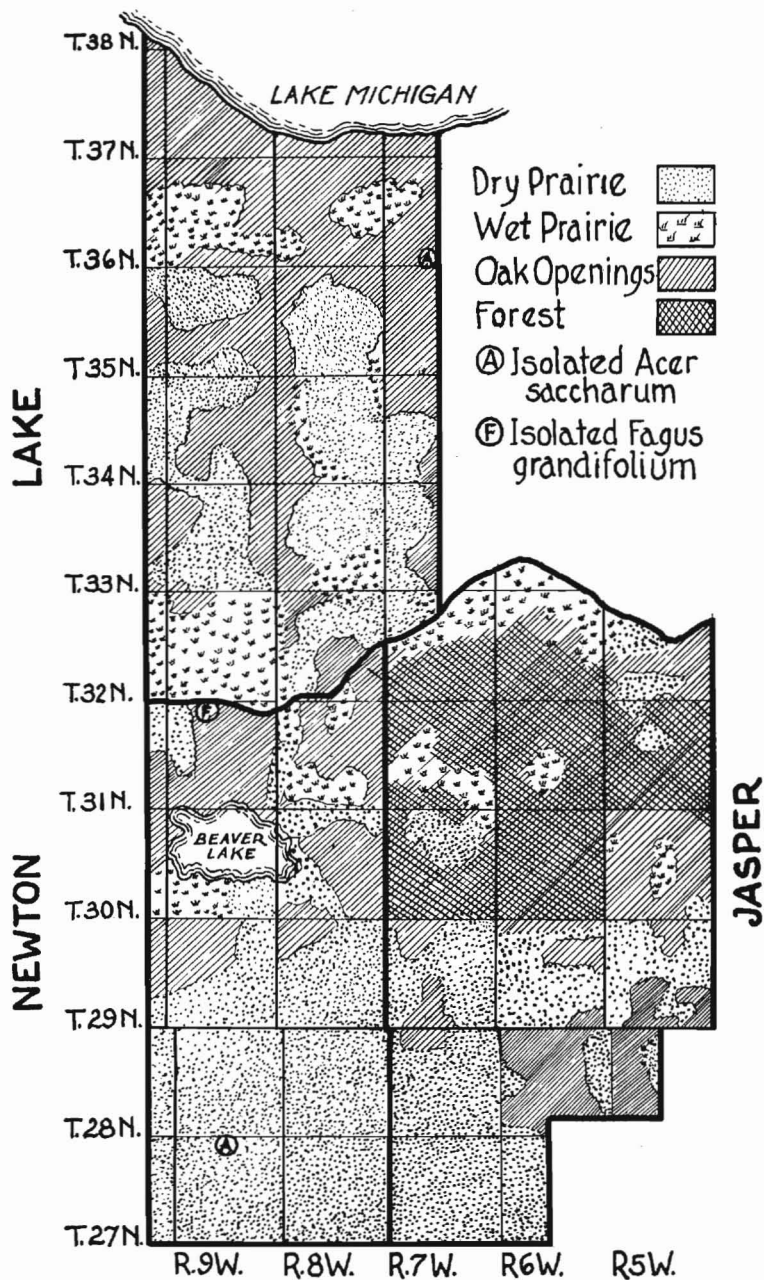


FIGURE 1

Graphic presentation of the four major vegetation types in Lake, Newton and Jasper counties, Indiana.

In locations where the surveyors' notes list only posts, the condition was interpreted as prairie. This assumption was further validated by notes on the region. Forest composition is shown in tables I-III, where total number of stems of the various species and genera are given for township units. The surveyors' Jack oak is included under *Quercus ellipsoidalis*, swamp oak under *Quercus bicolor*, and Spanish oak under *Quercus palustris*.

When the total number of stems recorded in a given county is very small then the method of expressing representation of the various species by percentages gives an erroneous impression of crown control. In fact, there was very likely no real crown control by arboreal species in the three counties. For that reason, in tables I-III, number of stems rather than percentages are given. Figure 1 presents the localities where use of posts suggested typical prairie conditions.

OBSERVATIONS

The northwestern three counties in Indiana present a number of features which might be interpreted as contact between two major formations, with ecotone conditions intervening. The prairie in Indiana no doubt had scattered trees even in areas of its best expression, and the open forest very likely had prairie grasses as under-story vegetation—for crown cover of the trees must have been very open. This is indicated by the small number of stems recorded and frequent use of posts to mark corners. When comparison is made between these three counties, and densely-wooded townships of central Indiana described by Blewett and Potzger (1) and Potzger and Potzger (3) the prairie influence is strikingly shown by the small number of stems in certain townships of the present study. Real forest cover was found perhaps only in Jasper County (T.30 N., R. 5W. and T.30 N., T.31 N., T. 32 N., R. 6 W and R. 7 W.). These counties also mark the western limits of *Acer saccharum* (Newton County, T. 27 N., R. 9 W., and Lake County, T. 36 N., R. 7 W.) and *Fagus grandifolia* (Newton County, T. 31 N., R. 9 W.). In Lake County we also find the southern limits for western Indiana of Jack pine and arbor vitae. The forest is marked by its abundance of oak. Dominating were *Quercus alba*, *Q. velutina*, *Q. macrocarpa* and "yellow oak." In Jasper County and Newton County *Carya* played a very insignificant role; but in T. 33, 34, 35 N., R. 7, 8 and 9 W. in Lake County, *Carya* was sufficiently abundant to justify the classification of the forest as

of the oak-hickory type. The more mesic genera are wanting in these counties, or appear only sparingly.

Unfortunately there is no definite way to know which characteristics the surveyors used to differentiate between black and yellow oaks. In central Indiana yellow oak was not listed, but black oak was recorded. If black and yellow oaks are, indeed, synonymous then black oak was the most abundant of all oaks in these counties. *Quercus macrocarpa* was abundant in the greater part of Lake County and in some townships of Jasper County. Stems of trees measuring 36 inches DBH. or over were as follows: (Lake County *Quercus alba* 4, *Q. rubra* var. *borealis* 1, *Q. macrocarpa* 6, yellow oak 3, *Q. palustris* 2, *Pinus strobus* 1; (Newton County), *Quercus alba* 8, *Q. rubra* var. *borealis* 1, *Q. macrocarpa* 2, *Q. velutina* 11; (Jasper County) *Quercus alba* 20, *Q. macrocarpa* 11, *Q. velutina* 3, *Q. ellipsoidalis* 1, yellow oak 5, *Platanus occidentalis* 3. This makes a total of 83 stems for the three counties. In general, the diameter of stems was small, most of the trees ranged between 4 and 20 inches DBH. Only 1.6 per cent of the stems ranged from 36 inches DBH. upward. According to the field notes, *Pinus strobus*, *P. banksiana* and *Thuja occidentalis* were limited to a belt about a mile inland from Lake Michigan. While the forest is constituted chiefly of various species of oaks, habitat played a selective role. *Quercus palustris*, *Q. bicolor*, and *Q. macrocarpa* are favored by wet soil, *Q. rubra* var. *borealis* and yellow oak by medium-wet soils, and *Q. velutina* by dry, sandy soil. *Quercus alba* appears to be cosmopolitan, as Potzger (2) found the same species to be in Ripley County.

DISCUSSION

The vegetation pattern in the three counties is really quite clearly defined and rather simple in structure. A grassland vegetation yields to an ecotone oak opening type of tree-grass vegetation, and this in turn merges into a definite oak or oak-hickory forest association (T. 30N. to T. 32N., R. 6W. and R7.W.). For want of any studies on climatic and edaphic factors, it would be folly to venture an explanation of the causes underlying the variation in vegetation, even within the confines of a single county. However, the sharp demarkation between individual species and between associations is striking evidence that a climatic or edaphic selection operates. Potzger and Keller (4) found that *Fagus* declines progressively from township to

township as one moves from south, east and north into the prairie area. One is impressed, however, that microclimate permits such mesic species as *Fagus grandifolia* and *Acer saccharum* to extend a disjunct range into otherwise inhospitable environment, considerable distance from the great mass of their mesic association (Fig. 1).

These phenomena indicate that the habitat changes progressively as one proceeds into the grass-controlled areas. From a mixed mesophytic forest association the more mesic species, like *Fagus* and *Acer saccharum* drop out first, and the more xeric oaks and hickories maintain the crown control. As one moves into the ecotone trees decrease in number as well as in diameter of stems, indicating increasing difficulty for forest to maintain dominance at all. Finally, of course, forest yields to a grass association. These are the bare facts, and it is perhaps all one should expect of the study. It has its greatest significance in the factual data rather than in its explanatory value. In fact, statistical records from surveyors' notes and tabulations make no claim for explanation. In this study they project only the dramatic behavior of plants, both as individuals and as associations, along boundaries of critical habitat conditions, giving not even a hint whether the control is due to aerial or edaphic factors. They do point to the need of additional detailed habitat and climatic studies which might give some explanation of the striking controls on vegetation which are revealed by the statistical data.

SUMMARY

1. The paper presents data on the vegetation of three northwestern Indiana prairie counties (Lake, Newton and Jasper) as recorded in the field notes of the surveyors associated with the original United States land survey.

2. Four types of plant associations are present, viz. dry prairie, wet prairie, oak openings, and oak or oak-hickory forests.

3. Only in Lake County is hickory sufficiently abundant to warrant classification of the forest cover as of the oak-hickory type.

4. The most prominent oaks are *Quercus alba*, *Q. velutina*, *Q. macrocarpa* and "yellow oak" (the authors have no criteria to differentiate between the surveyors' "yellow" and "black" oaks).

5. In townships where only, or primarily, posts were used as witness markers prairie conditions are assumed. In the field notes such treeless areas were classified as wet or dry prairie.

LITERATURE CITED

1. BLEWETT, MARILYN BOWMAN AND J. E. POTZGER. The forest primeval of Marion and Johnson counties, Indiana, in 1819. *Butler Univ. Bot. Stud.* 10(5). 1951.
2. POTZGER, J. E. Forest types in the Versailles State Park area, Indiana. *Am. Midland Nat.* 43:729-741. 1950.
3. ——— AND MARGARET ESTHER POTZGER. Composition of the forest primeval from Hendricks County to Lawrence County, Indiana. *Indiana Acad. Sci. Proc.* 60. 1951.
4. ——— AND C. O. KELLER. The beech line in northwestern Indiana. Ms. 1951.

TABLE I—(Continued)

Species or genera of trees, and number of stems of each, recorded in townships of Lake County

Names of Trees	Ranges west																																									
	7						8					9				10																										
	32	33	34	35	36	37	32	33	34	35	36	Towns north	37	31	32	33	34	35	36	37	31	32	33	34	35	36	37															
Spanish oak	1	1		2																																						
Yellow oak		10	13	35	31	5	5	5	9	19	104	20		12	14	17	52	84	32	1	4	6	2	4	13	13																
Salix sp.?	2	2	1				4	3						3	4	1											1															
Tilia americana				1												1																										
Thuja occidentalis																																										
Ulmus sp.?	1	3									1																															
Total stems	28	65	78	119	116	16	48	53	91	98	172	36	14	75	94	140	160	123	93	6	20	23	4	32	19	20																

TABLE II

Species or genera of trees, and number of stems of each, recorded in townships of Newton County

Names of Trees	Ranges west														
	8						9				10				
	28	29	30	Township north			28	29	30	31	27	28	29	30	31
<i>Acer rubrum</i> , <i>A. saccharinum</i>				2	2					2					
<i>A. saccharum</i>						1									
<i>Betula</i> sp.?				1	1					5					2
<i>Carya</i> sp.?	7						2				2				
<i>Fagus grandifolia</i>										1					
<i>Fraxinus</i> sp.?	1						1			1					
<i>F. americana</i>				1	6					1					
<i>Juglans nigra</i>	1			1		1					1	1			
<i>Nyssa sylvatica</i>								1		1					
<i>Populus</i> sp.?		1	1							4	7				2
<i>Prunus serotina</i>	2						2					1			
<i>Quercus alba</i>	3	23	55	54	19		8	45	25	33	8	5	14	13	7
<i>Q. ellipsoidalis</i>				31	4			2	3	7				1	
<i>Q. macrocarpa</i>	3	3	1			1	9	5			1	2	1		
<i>Q. palustris</i>		1	2	4				1							
<i>Q. rubra</i> var. <i>borealis</i>	2	1	23	6	3	3	6	11					7		
<i>Q. velutina</i>	3	18	38	1		2	7	31	11	33	2	2	8	8	9
Yellow oak		6	14	60	5		4	8	22	48		5	6	6	8
<i>Salix</i> sp.?			2		1										
<i>Sassafras albidum</i>			1												
<i>Tilia americana</i>	1						2								
<i>Ulmus</i> sp.?	1					1	1								
Total stems	24	53	137	161	41	10	41	104	65	139	15	15	36	28	28

TABLE III

Species or genera of trees, and number of stems of each, recorded in townships in Jasper County

Names of Trees	Ranges west																	
	5					Township north		6					7					
	28	29	30	31	32	27	28	29	30	31	32	33	27	28	29	30	31	32
<i>Acer rubrum</i> , <i>A. saccharinum</i>				6	2						19	11						20
<i>Betula</i> sp.?											6	2						2
<i>Betula nigra</i>				2														
<i>Carya</i> sp.?	4	3	3	3				1	5	1				7	4	1		
<i>Fraxinus</i> sp.?											2							
<i>F. americana</i>				2							5	13						34
<i>F. nigra</i>				3	2													
Ninebark				1														
<i>Nyssa sylvatica</i>																	1	
<i>Platanus occidentalis</i>				2							1							4
<i>Populus</i> sp.?		5	2				2	1	5	1	6				1	2	8	2
<i>P. deltoides</i>									2									2
<i>Quercus alba</i>	30	27	56	91	66		45	21	114	86	55	1	2	8	35	105	67	48
<i>Q. bicolor</i>											3							
<i>Q. ellipsoidalis</i>						2		16	22						3	26		
<i>Q. macrocarpa</i>	4	2	15	8				23	26					6	25	12		
<i>Q. palustris</i>	15						40			61	50	4		4			67	17
<i>Q. rubra</i> var. <i>borealis</i>			2	1	1					10	9	4			2		14	10
<i>Q. velutina</i>		24	57	99	57		3		3	1	3				15	11		
Yellow oak	23		23	24	25	10	58	22	49	57	50	5		36	9	22	30	41
<i>Salix</i> sp.?				5	2		1	2			6					4		9
<i>Ulmus</i> sp.?				4	1						5	8						7
Total stems	76	61	158	251	156	12	149	86	226	217	220	48	2	61	94	184	186	196