The James Bird Woods: An Old-growth Oak-hickory Remnant in Harrison County, Indiana

Damian V. Schmelz and David L. Hodde
Department of Biology
St. Meinrad College, St. Meinrad, Indiana 47577

Abstract

A census was made of 13.7 acres of the NE-facing tract, which lies along the eastern margin of the Crawford Upland physiographic unit in NW Harrison County. There were 19 species with dbh over 4 inches and 2 additional species in the 3-inch size-class. Stand density was 128 and stand basal area 126. Dogwood was especially numerous. Black oak, tuliptree, and white oak were the dominants, with the combined relative basal area of 76% and 88 stems in the 30-inch size-class and above. Past disturbance was reflected in the abundance of sassafras in the lower size-classes. A semi-log plot of density data according to size-classes indicated that the disturbance was minor or that it occurred long enough ago to permit recovery by the stand, which is again approaching a balanced distribution.

In the search throughout Indiana for natural areas of outstanding scientific or scenic value worth preserving, the Indiana Natural Areas Survey team studied the James Bird Woods in southern Indiana. While not a "primaeval piece" of forest and known to have been disturbed even recently, the stand was given the second highest priority rating as representing one of the best areas of its type remaining. A chapter in the survey's report (4) described the exact location, ownership and history, physiography, and general vegetational characteristics of the area. Detailed vegetational descriptions of old-growth forests (generally our closest approach to presettlement forests) are few and valuable, especially in view of the rapid rate of their disappearance. With the permission of the owner, the field work for the following analysis was done during the early spring of 1970.

Location and Description of the Area

Bird Woods is located 1½ miles northeast of Depauw in northwestern Harrison County and lies along the eastern margin of the unglaciated Crawford Upland physiographic unit. Soils of the NE-facing slope have been derived from upper sandstone and from the lower limestone characteristic of the adjacent Mitchell Plain.

The plateau along the western edge of the tract as well as the valley to the east were farmed. Timber of various stages of secondary succession covered the lower slope, and the southern end of the wooded area showed evidence of heavy cutting and perhaps grazing. From the approximately 30 acres of old-growth timber some trees were cut in 1963 and in 1922, and some damaged trees were removed at other times.

Procedure

A census was made of 13.7 acres in the center of the NW-SE tract of old-growth timber, following the techniques outlined by

Schmelz and Lindsey (7). This area, roughly rectangular, ran the length of the slope but was of varying widths as necessary to avoid edge and disturbance effects. Permanent markers were not placed, but corners were recorded on a map by angles and distances to nearby large trees. Trees larger than 4 inches dbh were identified and measured by diameter tape, and those estimated 2-4 inches dbh were recorded by species (Table 1). Nomenclature followed Little (6), and stand attributes (Table 2) for trees larger than 4 inches dbh were those of Lindsey (3). Importance values were obtained by averaging relative density and relative basal area for each species.

Stand Description

Stand density of the 19 species of trees over 4 inches dbh was 128 and stand basal area 126. There were 97 stems per acre in the 2-4 inch size-class and 2 additional species. These data compared favorably with those of the few other old-growth oak-hickory stands remaining in Indiana, especially when the cutting history has been considered.

Dogwood predominated numerically. It had 75 stems per acre in the 2-4 inch size-class. Its 57 stems per acre in the 6- and 10-inch size-classes accounted for 45% of the stand density. Next in abundance were tuliptree and black oak, each with 12%. Dogwood accumulated 7.0% of the stand basal area, ranking fourth. The unusual result was that this species had the highest importance value (26%) of all the species in the stand, clearly showing that this importance value cannot be used alone to assess species dominance. The highest values for this species in similar stands elsewhere in Indiana, as far as the authors know, were 13 stems per acre and importance value of 6.5% in Jackson's Woods, Ripley County (2). The aspect of the tract in the spring, when the field work was done, was most striking.

The stand dominants were black oak, tuliptree, and white oak, combined giving 76% of the stand basal area. These 3 species had 88 stems in the size-classes 30 inches and above. Their densities were about equal. Although black oak dominated by basal area, tuliptree and white oak were much better represented in the lower size-classes. Pignut hickory also was well represented in the smaller sizes. Red oak stems were among the largest but were very few in number and scarce in the lowest sizes. Shagbark hickory was conspicuously absent.

The reliability of the stratum rank technique for rapid analysis of forest stands was confirmed by the fact that the earlier stratum rank of tree species in the entire tract (4) accurately reflected the stand attributes determined from census data from the central portion.

The stand dominants were black oak, tuliptree, and white oak, to the criteria of Crankshaw *et al.* (1) and by a new method for classifying midwestern hardwood forests devised by Lindsey and Schmelz (5). The success of tuliptree and red oak, the number of

TABLE 1. *Size class table for Bird Woods.*

Species	Size Class Midpoints											Total	Total
	2-4″	6″	10″	14″	18″	22″	26″	30″	34″	38″	42″	>4″	>2″
Cornus florida	1034	771	12									783	1817
Liriodendron tulipifera	33	23	16	36	44	40	30	19	3	1	1	213	246
Quercus velutina	5	10	23	13	20	37	43	39	14	2		201	206
Quercus alba	39	46	42	28	23	18	8	6	3			174	213
Sassafras albidum	87	78	46	13	1							138	225
Carya glabra	5	22	51	29	15	7						124	129
Carya cordiformis		11	22	13	1							47	47
Quercus rubra	2			1	4	4	9	4		1		23	25
Acer saccharum	58	17	4	1								22	80
Fraxinus americana	3	5		3	3							11	14
Prunus serotina	4	3	1									4	8
Nyssa sylvatica		1		1	1							3	3
Rhamnus caroliniana	19	2										2	21
Ulmus thomasi	5	2										2	7
Cercis canadensis	3	2										2	5
Carya ovata			1	1								2	2
Ulmus rubra	23	1										1	24
Juniperus virginiana	8	1										1	9
Ulmus americana	2	1										1	3
Aralia spinosa	3												3
Vitis species	1												1
TOTALS	1334	996	218	139	112	106	90	68	20	4	1	1754	3088

TABLE 2. *Stand attributes for Bird Woods.*

Species	B_2	B_3	D_2	D_3	V_3
Quercus velutina	45	36	15	12	24
Liriodendron tulipifera	34	27	16	12	20
Quercus alba	16	13	13	9.9	12
Cornus florida	8.8	7.0	57	45	26
Carya glabra	7.8	6.2	9.0	7.1	6.6
Quercus rubra	5.8	4.6	1.7	1.3	3.0
Sassafras albidum	3.9	3.1	10	7.9	5.5
Carya cordiformis	2.2	1.7	3.4	2.7	2.2
Acer saccharum	0.46	0.37	1.6	1.2	0.81
Other species[1]	12	9.7	21	16	13
TOTAL	126		128		

[1] *Carya ovata, Cercis canadensis, Fraxinus americana, Juniperus virginiana, Nyssa sylvatica, Prunus serotina, Rhamnus caroliniana, Ulmus americana, Ulmus rubra, Ulmus thomasi.*

young sugar maple, and the presence of Carolina buckthorn indicated the mesic influence of the NE-exposure and the good cover of litter. However, beech was not present, and other upland mesophytic species were not important.

That the timber sold from the tract was mainly the valuable white oak would seem to be confirmed by its stand attributes. Basal area for this species was only about one-third and its importance value one-half that of black oak. It had fewer large stems than either black oak or tulip-tree. Disturbance was reflected also in the number of sassafras in all the lower size-classes. However, the semi-log plot of density data according to size-classes resulted in the fourth pattern of configuration suggested by Schmelz and Lindsey (7) as indicating the significant recovery from either minor disturbance in the recent past or more remote major disturbance.

Cores were taken by increment borer from the 4 major species, the oaks and tuliptree, and are being examined for growth rates as related to slope and to climatic data.

Although clearly not virgin timber and certainly affected by human disturbance, Bird Woods seems to be one of the better remnants of old-growth oak-history forest type left in Indiana. Its black oak-tuliptree-white oak composition is a variation from other related stands surveyed. The importance of dogwood is unusual, if not unique. Slightly removed from the census area is an open-growing white oak measuring 50.8 inches dbh, probably the second largest wild specimen in Indiana. But there appears to be little hope for the stand's preservation. The owner and guardian of the old timber died at the time of the field work, and at this writing the estate is being settled among the numerous heirs.

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