WOODY VEGETATION SURVEY OF ROCKY BRANCH NATURE PRESERVE, CLARK COUNTY, ILLINOIS

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ABSTRACT.—The vegetation of the Rocky Branch Nature Preserve is a typical example of the forests associated with the dissected Illinoian till of East-Central Illinois. It has a composition of 128 stems per acre (4" and above in diameter) with a basal area of 69 square feet. Of the 62 woody species present on the site, 28 are canopy trees, 13 are understory trees, and 21 are shrubs and vines. White Oak, the dominant species, comprises one-third of the total individuals and nearly one-half of the total basal area. It is followed in order of importance by black oak, sugar maple, red oak, shagbark hickory, pignut hickory, mockernut hictory and bitternut hickory. The site contains three well defined vegetation zones. The first zone is a mature upland forest dominated by white oak, the second is a lowland forest dominated by sugar maple, sycamore, slippery elm and black walnut and the third is second growth upland with white and black oak comprising more than 50% of the stand. A sapling and seedling survey indicates that sugar maple will become more important in the future.

Rocky Branch Nature Preserve is a 130-acre woodlot in which are found the forests typically associated with the Illinoian till of East-Central Illinois. The preserve, which is located in Clark County about six miles northwest of Marshall, Illinois, was purchased by the Nature Conservancy and is now under the trusteeship of Eastern Illinois University. The area is interesting botanically due to the appearance of many species of plants that are uncommon to this part of Illinois.

A few ecological and taxonomic studies have previously been conducted in the preserve. Stover (1930) made a checklist of the plants that occurred here and gave short descriptions of the common plant associations. A study of the bryophytes was undertaken by Vaughn (1941) and later by Arzeni (1947), while Hellinga and Ebinger (1970) completed a checklist of the vascular plants found in the preserve. The most recent ecological study completed was a survey of a 16-acre tract of mature timber to the west and separated from the rest of the preserve (Ebinger and Parker, 1969). In this survey, 36 woody species were found growing in the area with white oak being the most important, comprising one-half of the basal area and one-third of the total individuals.

Description of the Woodlot

The eastern part of the Rocky Branch Nature Preserve, in which this survey was undertaken, is located in Section 29, T12N, R21W, Clark County, Illinois. Topographically, it is much the same as the western area (Ebinger and Parker, 1969) with a high variability in slope and relative relief. The maximum variation in elevation is 73 feet, the highest point being the south-east corner at 648 feet above sea level.

The area is drained by two main streams. One, Rocky Branch Creek, is in the western half of the woodlot and divides the area into two main vegetation zones. This creek flows in a north-easterly direction, and empties into Big Creek, the second major stream, which forms the northern boundry of the preserve. Sandstone outcroppings result in 20- to 50-foot bluffs along both of these streams.

The western part of the area studied, west of Rocky Branch

Creek, is flat to gently rolling upland. This area is in relatively mature, undisturbed forest. Except for a few acres of lowland forest along Rocky Branch Creek and Big Creek, the remainder of the preserve, to the east of Rocky Branch Creek, is rolling upland. This area is in second growth forest, though two small fields are located along the flat ridges near the southern edge of the area. This entire area is dissected by small intermittent streams that create shallow to occasionally deep ravines.

Of the 130 acres in the preserve, only 70 acres were included in this study. An area of approximately 20 acres in the south-west corner of the nature preserve is highly disturbed, and to the south-east is 9 acres of open field. To the north-east is a 20-acre area of highly dissected upland. Owing to the irregular shape of this area, it would have been extremely difficult to set up any meaningful quadrats. Also, a 10-meter edge was set aside on the western, southern and eastern borders of the area to account for edge effect. This, together with a northern edge of steep, sandstone bluffs which border Big Creek, accounted for another 11 acres.

METHODS

The woodlot was surveyed and marked off into quadrats that were 50 meters on a side (0.61776 acres); each quadrat was then divided diagonally into quarters to facilitate surveying the vegetation. The number, size and species of all trees above 4 inches d.b.h. were recorded for each of the quadrats. Diameters were recorded to the nearest 1/10 of an inch. Dead standing and dead down trees were measured and identified when possible. Trees displaying coppice growth were treated in much the same way as other trees; the species were identified and the number and d.b.h. of the stems were recorded. In the analysis of the data each stem of a coppice tree was considered a separate individual.

The Importance Value (IV) was calculated from the field data to provide a better basis for comparison of the various species. The determination of the IV followed methods outlined by McIntosh (1957) and later by Boggess (1964) in which the IV is the sum of the relative dominance:

$$\frac{\text{basal area of a species}}{\text{basal area of all species}} \times 100$$

and the relative density:

$$\frac{\text{number of individuals of a species}}{\text{number of individuals of all species}} \times 100$$

In each 50 meter quadrat, four 1/100 and 1/1000 acre, nested, circular plots were randomly located. The saplings (1- to 4-inches d.b.h.) were tallied on the larger plot and the seedlings on the smaller. The seedlings were divided into those under one foot in height and those over one foot in height but less than one inch in diameter.

The taxonomic nomenclature used in this paper follows that of Ebinger and Thut (1970).

RESULTS AND DISCUSSION

A total of 62 woody species was found in the woods. Of these 28 were canopy trees, 13 were understory trees and 21 were shrubs or vines. The more important species encountered with their density and frequency by height and diameter appear in Table 1. In this table, the species which had extremely low density and frequencies are grouped together under the category of "others". The species symbols are used to identify the species in subsequent tables. The 11 leading species encountered with their relative

TABLE 1.—Density per Acre and Frequency of Woody Species by Height or Diameter Class. The species symbol will be used to identify species in subsequent tables.

Scientific Name	SYMBOL	Height Class Density <1'	Density >1' <1" d.b.h.	Density Total	Frequency % <1'	Frequency % >1' <1" d.b.h.	Diameter Class 1"-4" d.b.h. Density	1"-4" Frequency %	4"+d.b.h. Density	4"+d.b.h. Frequency %
CANOPY TREES										
Quercus alba L.	WO	162	138	300	10.8	10.0	14.6	9.4	40.00	98.2
Quercus velutina Lam.	BO	264	124	388	19.7	10.4	12.2	9.6	17.41	94.7
Acer saccharum Marsh	SM	1,990	423	2,413	44.7	20.3	45.0	18.9	10.91	77.3
Quercus rubra L.	RO	58	69	127	4.3	5.9	3.9	3.7	6.38	79.1
Carya ovata (Mill.) K. Koch	SH	128	167	295	9.6	12.9	22.4	14.6	8.90	92.1
Carya glabra (Mill.) Sweet	PH	222	73	295	15.9	5.1	2.6	2.6	5.54	80.0
Carya tomentosa (Poir.) Nutt.	MH	38	96	134	2.6	7.7	22.6	13.8	6.31	81.7
Carya cordiformis (Wang.) K. Koch	BH	139	45	184	10.6	3.9	5.1	4.1	3.23	54.7
Ulmus rubra Muhl.	SE	256	555	811	13.1	20.8	16.3	9.1	3.42	59.1
Sassafras albidum (Nutt.) Nees	Sa	488	193	681	19.2	12.7	17.9	7.5	3.83	53.0
Fagus grandifolia Ehrh.	Be	53	10	63	4.5	0.9	1.0	0.8	1.69	25.2
Juglans nigra L.	BW	2	2	4	0.2	0.2	1.0	1.0	2.04	48.6
Prunus serotina Ehrh.	BC	266	106	372	16.5	8.3	3.7	3.1	2.16	48.6
Platanus occidentalis L.	Sy	—	—	—	—	—	0.2	0.2	1.41	20.2
Fraxinus americana L.	WA	758	156	914	28.3	8.3	2.2	1.8	1.74	41.7
Liriodendron tulipifera L.	TT	14	8	22	1.2	0.2	1.0	0.5	1.13	14.7
Nyssa sylvatica Marsh	BG	34	26	60	2.3	1.9	5.1	2.4	1.21	26.0
Quercus imbricaria Michx.	SO	86	30	116	6.8	2.7	0.4	0.4	2.04	42.6
Acer negundo L.	BE	—	2	2	—	0.2	1.4	1.0	1.04	13.9
Ulmus americana L.	AE	10	57	67	0.9	3.1	4.3	3.3	.64	20.0
Juglans cinerea L.	Bu	2	—	2	0.2	—	0.2	0.2	.64	14.7
Tilia americana L.	AL	—	—	—	—	—	0.6	0.2	.49	11.3
Celtis occidentalis L.	Ha	13	8	21	1.3	0.7	1.6	1.2	.41	12.1
Others		2	6	8	—	—	0.2	—	.72	—
UNDERSTORY TREES										
Ostrya virginiana (Mill.) K. Koch	Ir	939	234	1,173	32.2	12.5	20.3	12.0	1.93	37.3
Carpinus caroliniana Walt.	BB	309	127	436	11.0	6.8	22.2	6.1	1.21	24.3
Cercis canadensis L.	Re	37	7	44	3.1	0.7	1.6	1.2	.30	6.0
Cornus florida L.	FD	232	183	415	12.2	11.4	30.9	17.7	.26	14.7
Morus rubra L.	RM	12	17	29	0.7	1.5	0.6	0.6	.19	6.9
Amelanchier arborea (Michx.f.) Fern.	Ju	45	11	56	1.9	1.1	2.6	2.0	.09	5.2
Others		4	13	17	—	—	0.2	—	.27	—
WOODY SHRUBS AND VINES										
Rhus radicans L.		673	448	1,121	17.5	10.2	—	—	—	—
Rubus allegheniensis Porter		98	574	672	5.3	15.7	—	—	—	—
Euonymus obovatus Nutt.		419	—	419	4.3	—	—	—	—	—
Corylus americana Walt.		63	198	261	3.1	7.2	0.2	0.2	—	—
Staphylea trifolia L.		108	131	239	21.2	25.7	1.2	0.8	—	—
Rosa carolina L.		167	66	233	6.6	2.3	—	—	—	—
Celastrus scandens L.		130	80	210	8.2	3.7	—	—	—	—
Rhus glabra L.		24	177	201	0.3	4.9	—	—	—	—
Ceanothus americanus L.		8	143	151	0.7	5.9	—	—	—	—
Euonymus atropurpureus Jacq.		93	23	116	18.1	4.5	—	—	—	—
Viburnum prunifolium L.		26	72	98	0.9	1.7	—	—	—	—
Rubus occidentalis L.		6	64	70	0.5	2.3	—	—	—	—
Hydrangea arborescens L.		6	57	63	0.5	1.9	—	—	—	—
Others		23	128	151	—	—	2.7	—	—	—
TOTAL		8,407	5,047	13,454	—	—	268.0	—	127.54	—

values and number of individuals and basal area per acre in broad diameter clases are included in Table 2.

Of the aborescent species found at Rocky Branch, the oaks (white, black and red) rank first, second and fourth in importance, respectively, and comprise the most important species group in the woodlot. White oak, with an IV of 76.2, comprises nearly one-half of the basal area and one-third of the total individuals in the area studied. It exceeds all other species in all broad diameter classes. This species is considered the leading dominant in all sections of the woodlot except the small lowland areas adjacent to Big Creek and Rocky Branch Creek.

Black and red oak, together, have an IV of 38.5 with black oak ranking second to white oak throughout the hillside and upland areas of the woodlot. Both species have a relatively good size class distribution, with a majority of the individuals appearing in the 4- to 6- and 7- to 12-inch diameter classes. Black oak has a good showing among the saplings and seedlings, and is better represented than is white oak. Red oak has a relatively poor representation of saplings and seedlings.

The second most important species group in the woods is the hickories. The group is represented by shagbark, pignut, mockernut and bitternut hickories which rank fifth, sixth, seventh and eighth respectively. Shagbark and mockernut hickories are well distributed throughout the area, with respective frequencies of 92.1 and 81.7 percent. Although pignut hickory is not as well distributed throughout the woodlot, its more common occurrence in the larger diameter classes makes this species, overall, more important than mockernut hickory. Of the four species of hickory represented bitternut is the most restricted, with a relative frequency of only 54.7 percent. Pignut is the only species of this genus with members in the 25 inch or greater diameter class.

The third most important species in the woodlot is sugar maple. With an IV of 15.8, this species accounts for approximately one-tenth of the basal area and one-tenth of the total individuals per acre in the woodlot. More than one-half of the individuals of sugar maple occur in the 4- to 6-inch diameter class and none in the 25-inch or greater diameter class. This species is not evenly distributed throughout the woods. It ranks first in importance in the lowland area around Rocky Branch Creek and is also common on the more mesic hillsides. Sugar maple has a greater number of saplings and seedlings per acre tha nany other species or species group in the woods.

Slippery elm, sassafras, beech, black walnut and sycamore are scattered throughout the more mesic parts of the woods, but have Importance Values of less than 5. Most of these species are more common in the lowlands surrounding Rocky Branch and Big Creeks. Few seedlings and saplings of black walnut and sycamore occur in the sample plots and both have poor size-class distribution, indicating that they will decrease in importance in the future. Slippery elm and sassafras, in contrast, have much better size-class distribution and are well represented in the seedling and sapling categories. Both species are extremely common in the lowlands but small diameter trees as well as seedlings and saplings are not uncommon in the upland areas. Very few individuals of these species were found above the 4- to 6-inch diameter class. Beech is common on the relatively steep slopes and lowlands surrounding Rocky Branch Creek but occurs very rarely in the remainder of the

TABLE 2.—Number of Trees, Basal Area per Acre and Importance Value (IV) of the Eleven Leading Dominants.

	4-6 inches		7-12 inches		13-18 inches		19-24 inches		25 + inches		Total		Percent Total		
Species	No.	B.A.	No.	B.A.	No.	B.A.	No.	B.A.	No.	B.A.	No.	B.A.	Rel. Den.	Rel. Dom.	I.V.
WO	11.03	1.80	15.23	8.41	11.94	15.89	1.56	3.73	0.24	1.09	40.00	30.92	31.4	44.8	76.2
BO	7.63	1.20	6.89	3.51	2.41	3.17	0.37	0.91	0.11	0.53	17.41	9.32	13.7	13.5	27.2
SM	5.50	0.82	3.81	1.87	1.44	1.90	0.16	0.40	...	...	10.91	4.99	8.6	7.2	15.8
RO	2.37	0.37	2.46	1.35	1.14	1.52	0.34	0.87	0.07	0.27	6.38	4.38	5.0	6.3	11.3
SH	5.93	0.93	2.63	1.26	0.33	0.38	0.01	0.03	...	...	8.90	2.60	7.0	3.8	10.8
PH	1.49	0.24	2.81	1.56	1.19	1.47	0.04	0.10	0.01	0.06	5.54	3.43	4.3	5.0	9.3
MH	4.11	0.62	1.86	0.90	0.33	0.39	0.01	0.03	...	...	6.31	1.94	4.9	2.8	7.7
BH	1.56	0.24	1.36	0.68	0.30	0.36	0.01	0.03	...	...	3.23	1.31	2.5	1.9	4.4
SE	2.27	0.33	0.94	0.40	0.20	0.24	0.01	0.03	...	...	3.42	1.00	2.7	1.5	4.2
Sa	3.16	0.43	0.64	0.26	0.03	0.03	...	...	...	...	3.83	0.72	3.0	1.0	4.0
Be	0.59	0.09	0.63	0.32	0.40	0.56	0.06	0.12	0.01	0.07	1.69	1.16	1.3	1.7	3.0
Others	12.05	1.82	6.30	2.94	1.24	1.54	0.27	0.68	0.06	0.26	19.92	7.24	15.6	10.5	26.1
TOTAL	57.69	8.89	45.56	23.46	20.95	27.45	2.84	6.93	0.50	2.28	127.54	69.01	100.0	100.0	200.0

woods. The mesic site preference of this species as well as the small number of seedlings and saplings indicates that its importance will probably not increase in the woods.

To better analyze the stand data, the woods was divided into three zones based on the topography and age of the timber. Although these three zones are in part artificial, they do allow a more accurate analysis of the species distribution and ecological relationships. These zones are: a mature upland forest to the west of Rocky Branch Creek, a small area of lowland forest immediately surrounding Rocky Branch and Big Creeks, and a second growth upland forest to the east of Rocky Branch Creek. The number of trees and basal area per acre, relative values and Importance Value for the 10 leading species in each zone are shown in Table 3. The vegetation of the steep hillsides on both sides of Rocky Branch Creek is included with the upland data.

Mature Upland Forest.—The area to the west of Rocky Branch Creek is a dry, relatively flat upland dissected by a few shallow ravines. White oak is the dominant species with an Importance Value of 110. The IV of this species exceeds 100 on all quadrats of this zone and on some exceeds 160. Over 80 percent of the white oaks are in the 7- to 12- and 13- to 18-inch diameter classes. Black and red oaks rank second and fourth in importance and are most common in the more mesic parts of the upland forest. As a group, the three oak species comprise 63 percent of the total number of trees and 77 percent of the stand basal area. The oaks are well represented in the seedling category with white oak averaging 398 seedlings and 8 saplings per acre while the total for black oak are 363 seedling and 10 saplings.

Pignut hickory is a common associate of the upland forest (third in IV) while the other hickory species have much lower importance values. The more mesophytic sugar maple, beech and slippery elm are also scattered throughout this zone. Slippery elm exceeds all other trees in seedlings with 2023 per acre while sugar maple exceeds all other species in saplings with 64 per acre. Sassafras, which is not included among the top ten in importance is also well represented in the seedling and sapling categories. This species averaged 852 seedlings and 30 saplings per acre in the mature upland forest.

Lowland Forest.—The lowland forest is in scattered areas along Big Creek and some of its tributaries with its best development surrounding Rocky Branch Creek. Here, sugar maple is the most important species with an IV of 36. Sycamore is second in importance followed by slippery elm and black walnut. The lowland forest is the smallest zone recognized in the woods yet it contains the greatest number of species. The great diversity of species found here and the relatively high importance of these minor species is indicated by the IV of the "others" category which is almost twice that of sugar maple, the leading dominant. The more important of these "minor" species are white walnut, tulip tree, american elm, hackberry and ironwood.

Regeneration of woody species is much higher than in other zones of the woods with the species in this zone averaging 20,728 seedlings and 484 saplings per acre. A few of the dominant species have excellent regeneration with sugar maple averaging 4,642 seedlings and 77 saplings, slippery elm with 1029 seedlings and 77 saplings and blue beech with 1957 seedlings and 144 saplings per acre. The remainder of the

TABLE 3.—Number of Trees, Basal Area per acre, Relative Values and Important Values for the 10 Leading Dominants (4 inches d.b.h. and above) in each of the Three Vegetation Zones.

Species	Mature Upland Forest (14.2 acres)						Second Growth Upland Forest (49.0 acres)						Lowland Forest (6.8 acres)					
	No. Trees	Basal Area	Rel. Den.	Rel. Dom.	IV	IV Rank	No. Trees	Basal Area	Rel. Den.	Rel. Dom.	IV	IV Rank	No. Trees	Basal Area	Rel. Den.	Rel. Dom.	IV	IV Rank
WO	54.4	54.3	47.5	62.6	110.1	1	38.9	27.3	32.1	44.4	76.5	1	3.4	3.4	2.4	5.7	8.1	8
BO	11.8	7.8	10.3	9.0	19.3	2	19.9	10.4	16.4	17.0	33.4	2	....	...	....	....	....	..
PH	11.3	8.0	9.9	9.2	19.1	3	4.3	2.4	3.5	3.9	7.4	7	....	...	....	....	....	..
RO	5.9	4.9	5.2	5.6	10.8	4	5.5	3.7	4.5	6.1	10.6	5	5.3	2.1	3.8	3.6	7.4	9
SH	6.5	1.9	5.7	2.2	7.9	5	10.4	3.0	8.6	4.8	13.4	4	....	...	....	....	....	..
SM	5.6	1.8	4.9	2.1	7.0	6	9.8	4.6	8.1	7.5	15.6	3	23.0	11.8	16.4	20.0	36.4	1
BH	4.0	1.7	3.5	2.0	5.5	7	1.9	.9	1.5	1.4	2.9	10	7.1	2.0	5.0	3.3	8.3	7
MH	2.6	1.3	2.3	1.5	3.8	8	8.0	2.3	6.6	3.7	10.3	6	....	...	....	....	....	..
Be	2.0	1.5	1.7	1.7	3.4	9	....	...	....	....	....	..	....	...	....	....	....	..
SE	2.4	.6	2.1	.7	2.8	10	2.5	0.7	2.1	1.2	3.3	9	11.2	3.5	8.0	5.8	13.8	3
Sa	....	...	....	....	....	..	4.2	0.8	3.5	1.3	4.8	8	7.1	1.2	5.0	2.0	7.0	10
Sy	....	...	....	....	....	..	....	...	....	....	....	..	12.1	7.9	8.6	13.0	21.6	2
BW	....	...	....	....	....	..	....	...	....	....	....	..	8.7	3.5	6.2	5.8	12.0	4
BE	....	...	....	....	....	..	....	...	....	....	....	..	10.5	2.3	7.5	3.8	11.3	5
BB	....	...	....	....	....	..	....	...	....	....	....	..	8.7	1.4	6.2	2.3	8.5	6
Others	8.1	3.0	6.9	3.4	10.3	..	15.7	5.4	13.1	8.7	21.8	..	43.0	20.9	30.9	34.7	65.6	..
TOTALS ..	114.6	86.8	100.0	100.0	200.0	—	121.1	61.5	100.0	100.0	200.0	—	140.1	60.0	100.0	100.0	200.0	—

top ten species had much poorer regeneration and both black walnut and sycamore were not represented in these categories. Numerous shrubs were also found in the lowland forest with bladdernut and wahoo being the most common.

Second Growth Upland Forest.— The area to the east of Rocky Branch Creek is, for the most part, flat to gently rolling upland. It is dissected in several places by intermittent streams that form relatively deep valleys where they enter Rocky Branch or Big Creek. Many of the trees in this area were probably cut after the turn of the century and it still exhibits a disturbed condition at the present time.

As in the mature upland forest, white oak is the dominant species, but here its IV is only 76.5. Rarely does the importance of white oak exceed 100 on the individual quadrats of this zone. Except for quadrats associated with valleys, its IV usually varied from 55 to 90. White oak, together with the second most important species, black oak, make up better than 50 percent of the total IV of this zone. Other important species of this zone are sugar maple, shagbark hickory, red oak and mockernut hickory (Table 3). Though their importance differs, the dominant species of both upland regions is nearly the same. The only difference being that sassafgras replaces beech among the top ten in the second growth upland forest.

Sugar maple is reproducing better than any other woody species in this zone, averaging 2332 seedlings and 27 saplings per acre. Sassafras is also well represented with 714 seedlings and 17 saplings per acre. Among the oaks, white oak has 327 seedlings and 19 saplings per acre while black oak averages 439 seedlings and 15 saplings per acre. Other species with large numbers of seedlings include shagbark hickory, slippery elm and white ash.

The understory trees ironwood, blue beech and flowering dogwood are very common in the second growth upland forest and are well represented in the seedling and sapling categories. The common shrubs include *Rosa carolina* L., *Rubus allegheniensis* Porter, *Ceanothus americanus* L. and *Rhus glabra* L.

The extent of tree mortality is not an important feature of the woods, averaging only 6.5 trees per acre with a basal area of 2.5 square feet per acre. The species with the highest mortality is white oak which averaged 2.1 dead trees per acre with a basal area of 0.7 square feet per acre. Dead slippery and american elms together averaged 1.7 trees per acre with a basal area of 0.9 square feet per acre. These results are similar to those for the western portion of Rocky Branch (Ebinger and Parker, 1969) which averaged 8.6 dead trees per acre with a basal area of 3.0 square feet per acre.

The highest tree mortality occurs in the Rocky Branch Creek lowlands where it averages 10.3 trees per acre with a basal area per acre of 6.1 square feet. This high mortality is due to two species of elm. Slippery elm, with a mortality of 2.9 trees per acre and american elm, with 3.1 trees per acre, comprise 58 percent of the trees and 83 percent of the total basal area. In the mature upland forests mortality averages 8.3 trees per acre and 3.2 square feet of basal area per acre. The major contributors in this zone are white and black oak. Mortality is lowest in the second growth upland zone, averaging 5.1 trees per acre and a basal area of 1.7 square feet per acre. Here white and black oak as well as both species of elm make up the major portion of the dead species.

Coppice trees are not uncommon in the Rocky Branch Nature Preserve. As used here, coppice growth refers to any tree with two or more stems from a common trunk, or only one stem, if it is associated with a stump, or a stem with an extensively swollen butt so as to indicate that it originated as a stump sprout (Downs, 1947). In the more disturbed woods of east-central Illinois coppice growth accounts for over 124 stems per acre and for nearly 50 percent of the stand basal area (Ebinger, 1973). In the Rocky Branch Nature Preserve, however, it averages only 27.7 stems per acre with a basal area per acre of 12.2 square feet (Table 4). White oak, with 6.70 trees per acre and 5.19 square feet, accounts for slightly less than one-half of all the coppice trees and their basal area. The importance of oaks and hickories in the woodlot is again shown, in that out of the first seven species listed as having some regular degree of coppice growth, six of them are either oaks or hickories.

Coppice trees are not very common in the mature forest and in the lowland forest. In the mature forest it averages 5.1 trees per acre with a basal area per acre of 5.3 square feet. White and black oak lead in the number of coppice stems per acre. The lowland forest averages 7.5 coppice trees per acre and a basal area of 5.9 square feet per acre with no one species dominating. The area with the most extensive coppice growth is the second growth forest to the east of Rocky Branch Creek and reflects the more disturbed nature of this zone. Here coppice trees average 19.3 per acre and account for a basal area of 14.5 square feet per acre. White oak is the most important with 8.5 trees and a basal area of 6.6 square feet per acre. It is followed by black oak and sugar maple.

The oaks as a species group are extremely important in the woods. White and black oak have a relatively good size class distribution and many seedlings and saplings. This indicates that these species represent

TABLE 4.—Extent of Coppice Growth

Species	Number of coppice trees per acre	Number of coppice stems per acre	Average number of stems per tree	Basal Area of Coppice Stems per acre	Percent of stems in woods that are coppice
WO	6.70	10.37	1.55	5.19	25.92
BO	2.94	5.67	1.93	2.99	32.56
SM	1.18	1.97	1.66	0.69	18.06
RO	0.87	1.45	1.67	0.77	22.81
SH	0.84	1.51	1.80	0.39	17.01
MH	0.66	1.14	1.74	0.30	18.09
PH	0.30	0.59	1.95	0.23	10.56
Sa	0.30	0.61	2.05	0.12	16.04
BW	0.26	0.57	2.22	0.19	27.97
WA	0.26	0.47	1.83	0.12	27.04
BH	0.23	0.46	2.00	0.16	14.15
Others	1.60	2.93	1.82	1.04	....
TOTALS	16.14	27.74	....	12.19	....

a relatively stable component of the community and their importance in the stand will continue. Red oak has poorer size class distribution and will probably not increase in importance except on more mesic sites.

The hickories as a group are fairly common in the woods. In general, they have good size-class distribution with shagbark and mockernut hickories having better than one half of the individuals in the 4- to 6-inch dimater class and no individuals in the 25-inch or greater class. They rank relatively high in seedlings and saplings and will probably increase slightly in importance in the woods.

Of the more mesic species occurring here, only sugar maple is making any notable advances throughout the woodlot. The number of seedlings (2413 per acre) is greater than the number of seedlings for the two leading species groups (oaks and hickories combined), and the number of saplings (45 per acre) is greater than for any other species. This large number of seedlings and saplings, its good size class distribution, and its ability to take advantage of canopy openings indicates that sugar maple will increase in importance. This indicates an overall trend toward a more mesic woodland situation. This trend has been observed by McClain and Ebinger (1968), Ebinger (1968) and by Ebinger and Parker (1969) in other upland forests in east-central Illinois.

Other species with large numbers of seedlings are white ash, slippery elm and sassafras. The seedlings of white ash have a poor survival value as indicated by the small number of saplings present and it is doubtful that the importance of this species will increase to any extent. Slippery elm, in contrast, ranks ninth in importance and has good size class distribution. The relatively low mortality figures and IV for slippery elm indicates that this species has never been an important component of the stand. The large numbers of seedlings, saplings and small diameter trees now present indicate that it could become much more important. The future of this species in the woods is not known however, because of its susceptibility to Dutch elm disease and phloem necrosis. Sassafras, which ranks tenth in importance in the woods, is well represented in seedlings, saplings and small diameter trees. It is common in the lowland and second growth forests (Table 3) and many seedlings and saplings are found in the mature upland forests. Root, Geis and Boggess (1971) found sassafras to be an important stand component in the upland forest of Hart Memorial Woods in Champaign County, Illinois ,and suggested that its importance is related to the advanced stage of soil development. In the Rocky Branch Nature Preserve, sassafras will initially increase in importance in the second growth upland but will probably decrease as the woods becomes a mature oak-hickory-maple forest.

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