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Vascular Flora of Three Ridges Mountain, Nelson County, Virginia

Francis D. Watson

College of William & Mary - Arts & Sciences

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VASCULAR FLORA OF THREE RIDGES MOUNTAIN
NELSON COUNTY, VIRGINIA

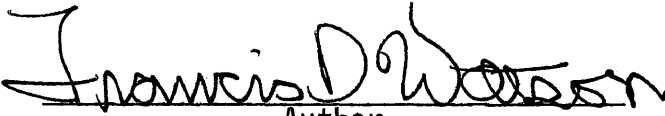
A Thesis
Presented to
The Faculty of the Department of Biology
The College of William and Mary in Virginia

In Partial Fulfillment
of the Requirements for the Degree of
Master of Arts

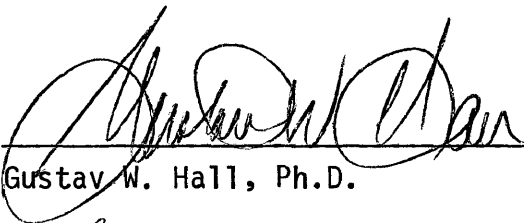
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1981


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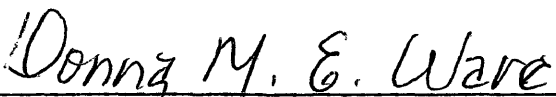
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Master of Arts


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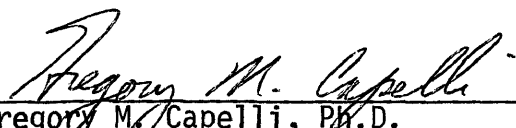

Gregory M. Capelli, Ph.D.

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ABSTRACT

Three Ridges Mountain is located in the southwest portion of Nelson County, Virginia, on the eastern escarpment of the Blue Ridge Mountains. The mountain as a natural unit encompasses approximately twenty square miles of land ranging from 850 to 3970 feet in elevation. Collecting trips were made at approximately weekly intervals from March through mid October 1976. Less extensive collecting was done in late October 1976 and the early spring of 1977. A total of 571 species representing 342 genera of 97 families of vascular plants was collected, dried and identified. Two hundred seventy three species constitute new county records, and one species has not previously been reported as occurring in the state of Virginia. A complete set of voucher specimens has been deposited in the Herbarium of the College of William and Mary.

Background information is provided on the area's location, geology, climate, soils and vegetation. A brief quantitative survey (using the Bitterlich Method) was made in seven stands representing seven different community types present (northern red oak, white oak, northern hardwoods, chestnut oak, moist cove, dry cove and successional forests). Brief qualitative descriptions are included for the more restricted and/or unusual habitats.

VASCULAR FLORA OF THREE RIDGES MOUNTAIN

INTRODUCTION

This project was undertaken to produce an annotated catalogue of the vascular flora of Three Ridges Mountain, Nelson County, Virginia. The distributional records established are intended as contributions toward the proposed manual of the vascular flora of Virginia, to be published by the Flora Committee of the Virginia Academy of Science.

Nelson County was chosen as a study site on the basis of meager published collection records for the flora of the counties along the Blue Ridge. A number of taxa have been reported from Nelson County in Freer's (1950, 1960, 1968) earlier studies of the Central Virginia Blue Ridge. Three Ridges Mountain was chosen as a relatively undisturbed area within Nelson County, and one which offered a potentially wide range of physiographic and ecological diversity and reasonable access. The mountain has not been mentioned in the botanical literature, although some collecting has been carried out there by some Virginia botanists, primarily Charles E. Stevens and Thomas F. Wieboldt.

As an interesting ornithological note and of possible significance in the past ecology of the area, the slopes of Three Ridges and the neighboring mountain to the south, the Priest, are apparently the only well-documented breeding areas of the now extinct Passenger Pigeon (Ectopistes migratorius) in the state of Virginia (Simpson 1976).

DESCRIPTION OF THE STUDY AREA

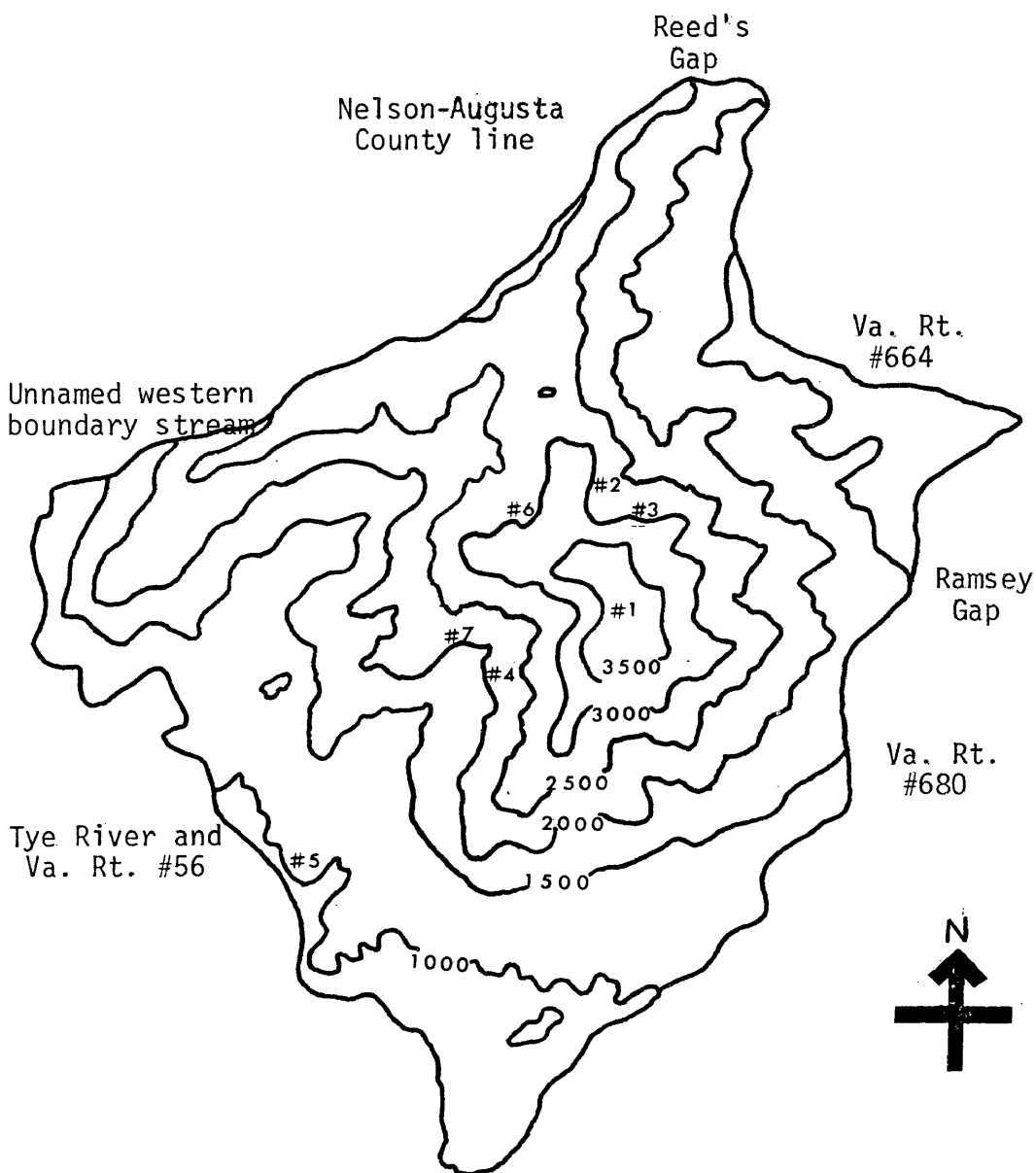
Nelson County is located in central Virginia with the crest of the Blue Ridge Mountains forming its western border. It contains a land area of 468 square miles which lies primarily in the Piedmont Physiographic Province (U.S.D.A.-S.C.S. 1970). The study area is not in the Piedmont, however, but comprises approximately 20 square miles of land located on the Eastern escarpment of the Central Blue Ridge Mountains of Virginia. Three Ridges Mountain as a unit of study was delineated by Virginia Routes 664 and 680 on the north and east respectively, with the Tye River and the North Fork of the Tye forming the southern border. An unnamed tributary, which enters the North Fork of the Tye at approximately 1250 feet, the Blue Ridge Parkway, and the Nelson-Augusta county line border the area on the west and northwest. So delineated, the area is a fairly natural geographical and physiographic unit.

The area has the steep and rocky aspect associated with much of the Blue Ridge. The altitudinal gradient ranges from approximately 850 feet along the Tye River at the area's southeastern edge to an elevation of 3970 feet at the summit. A wide range of degrees of slope and exposure are present (Fig. 1).

The bulk of the area lies within the Pedlar Ranger District of the George Washington National Forest, with an additional 640 acres contained within the Lesesne State Forest (bordering on Virginia Route 680), and the remainder in private holdings.

FIGURE 1

Three Ridges Mountain, general contour map,
and location of vegetational sampling sites,
(#1-7) (elevations are in feet)



GEOLOGY

The Blue Ridge Province is comprised of a belt of mountains lying between the Piedmont Province to the east and the Ridge and Valley Province to the west. The mountains represent the remnants of a former highland, uplifted with an eastern slope, which antedates the peneplains lying on either side. Most of the rocks of the Blue Ridge Province are "old, strong, and of highly complex structure" (Fenneman 1938).

Fenneman (1938) treats the Blue Ridge in two divisions, a northern and a southern section, separated by the Roanoke River. The linear form of the northern section gives it its distinctive character. From the Roanoke River north to the Susquehanna River the width of the range nowhere exceeds 12 to 14 miles, and often decreases to only half that distance. South of the Roanoke much broader expanses and higher peaks are characteristic.

Three Ridges Mountain lies in an area of highly irregular skyline of the central portion of the Blue Ridge in Virginia. This area runs approximately 25 miles north from Elk Pond Mountain (Lexington quadrangle) to Turk Mountain (Harrisonburg quadrangle) (Fenneman 1938).

Three Ridges Mountain is located in a complex area where none of the major geologic formations of the Piedmont, Blue Ridge, or the Ridge and Valley Province are structurally isolated. The Pedlar and Marshall formations, both of Precambrian age, and presumably formed through granitization of metasedimentary rocks, constitute the basement complex in the study area (Bloomer and Werner 1955).

The Pedlar formation, which forms the primary area of the basement complex of the Blue Ridge (north of Roanoke) is composed of an "assemblage of granitic, granodioritic, syenitic, quartz dioritic, anorthositic and unakitic rocks undifferentiable in the field as well as in certain fabric relations" (Bloomer and Werner 1955). These resistant rocks of the Pedlar formation comprise the bulk of the mountain which is surrounded by rocks of the less resistant Marshall formation, a primary constituent of the basement complex in the Piedmont. The rocks of the Marshall formation are a "gray or green, uniformly medium-grained gneiss consisting of quartz, potash feldspar, oligoclaseandesine (An 30), and biotite" (Bloomer and Werner 1955). Many of the mountains and smaller knobs east of the bulk of the Blue Ridge in this area have a similar structure.

Smaller outcroppings of rocks of the Swift Run formation and Catoclin greenstone, both of late Precambrian age, are also present. These are found overlying either formation of the basement complex. Where the Swift Run overlies the Pedlar formation "the lower part of the formation is a conglomeratic graywacke with clasts from about 0.50 inch to 5.0 feet in diameter composed of quartz, potash feldspar, lithic fragments, and a pastelike aggregate of chlorite and sericite" (Bloomer and Werner 1955). Catoclin greenstone (metavolcanic rocks of basaltic or andesitic composition) forms two belts south of a split in Maryland with one belt running along the mountains to the Tye River Gap, and the other in the Piedmont, separated by about 20 miles (Bloomer and Werner 1955). Three Ridges is located primarily between these belts. The Catoclin consists of "an undeterminable thickness of greenstone with several mappable members composed of graywackes, arkoses, and tuffs" (Bloomer and Werner 1955).

Within the study area outcrops consisting of Catoclin greenstone conformably overlie the Swift Run formation separated from it by an alternating succession of greenstone and metasedimentary or sedimentary beds (Bloomer and Werner 1955). Although not common in the area, these outcrops occur on both the Pedlar and Marshall formations of the basement complex. A prominent example of greenstone outcrops occurs at the Greenstone Overlook on the Blue Ridge Parkway just northeast of the study area proper.

SOILS

The soils of Nelson County belong to the Red-Yellow and Gray-Brown podzolic zonal soil groups, with some shallow azonal soils of the lithosols type also present (Braun 1950). These soils are distinctly acidic due to rainwater, acidified by the forest's litter, percolating through the soil and dissolving out free and adsorbed basic ions which are then lost through stream drainage (Daubenmire 1974). The county's soils as a whole have not been extensively described, excepting limited surveys on agricultural land in the Piedmont portion. A published map of the county's major soil associations was presented as tentative and subject to change pending more detailed surveys (U.S.D.A.-S.C.S. 1971).

The soils of the study area are mapped as members of two soil associations. The majority of the area's soils are members of the Porters-Tusquitee-Stony Land Association. Soils of this association dominate areas having "stony soils with brown to dark brown loam to silt loam surface soils and brown to reddish brown friable clay loam subsoils" (U.S.D.A.-S.C.S. 1970). A small portion of the study area contains soils of the Hayesville-Porters-Duke-Tusquitee Association which dominates areas of soil with "brown or dark reddish brown loam surface soils and brown to dark red clay to clay loam subsoils" (U.S.D.A.-S.C.S. 1970).

Considering the lack of a detailed soil map of Nelson County utilizing the current nomenclature (7th Approximation 1960 and 1967 Supplement), this summary is badly outdated. As there are no simple

rules for conversion between the older and newer systems of nomenclature this will not be attempted. However, based on the newer system of classification, the soils of the study area most likely represent three of the six soil orders occurring in the Southeast: Entisols, Inceptisols and Ultisols (U.S.D.A.-S.C.S. 1975).

CLIMATE

The climate of Nelson County is warm temperate, mesothermal with mountain influences in the western portion. Temperatures are relatively moderate and rainfall is distributed relatively uniformly throughout the year. Considering the county as a whole, the temperature averages 35°F in January and 76°F in July with precipitation totaling about 41 inches annually (Chamber of Commerce, Nelson County). Locally, the mountain topography would be expected to modify these climatic values. No climatic or microclimatic measurements were taken during this study.

The closest recording station to the area was Tye River 1 S.E., located approximately 10 miles southwest of Three Ridges Mountain in the Piedmont at an elevation of 710 feet (U.S.D.C. Weather Bureau 1961-1975). The data from this station, while probably quite similar to the lower elevations of the study area, presumably show higher average temperatures, a longer frost-free season and lower average precipitation than the study area as a whole. Big Meadows, approximately 60 miles north of the study area along the Blue Ridge Mountains at an elevation of 3535 feet is the closest station having an altitude similar to that reached in the study area (U.S.D.C. Weather Bureau 1961-1975). Data from this station should more closely approximate the general climatic conditions existing at the higher elevations, showing lower average temperatures, a smaller number of frost-free days per year, as well as higher and more erratic precipitation than Tye River 1 S.E.

Climatic data are given in Tables 1 and 2. Average monthly temperatures are given for the average of the five warmest years at Tye River 1 S.E. and the five coolest at Big Meadows between 1961 and 1975. Average monthly precipitation data are from the average of the five lowest years of rainfall at Tye River 1 S.E. and the five years of highest rainfall at Big Meadows between 1961 and 1975. Temperature extremes and freeze data are given in Table 2. Climatic data from Three Ridges Mountain would be expected to fall somewhere in the range of values between the two sets of data presented, depending on the elevation, exposure and microclimatic variables. The data are in good agreement with Hunt (1967) for the 10 wettest years (average = 59.10 inches/year), and the 10 driest years (average = 32.00 inches/year) over a 40 year period in the Appalachian Mountains.

Departures from the general data occur within the area in response to the area's physiography, creating both more moderate and more extreme microclimatic regimes. The location of several abandoned apple orchards above 2500 feet in the study area attests to microclimatic differences being likely correlated with the phenomenon of cold air drainage patterns in the area (Oosting 1948).

TABLE 1

Temperature data by months for the 5 highest years at Tye River 1 S.E., and the 5 lowest years at Big Meadows. Precipitation data is for the 5 highest years at Big Meadows, and the 5 lowest at Tye River 1 S.E.^a

<u>TEMPERATURE</u> (° F)	Jan.	Feb.	Mar.	April	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
TYE RIVER 1 S.E.	37.3	37.6	44.6	55.1	66.7	71.3	75.3	74.6	68.8	57.1	49.2	39.4	56.4
BIG MEADOWS	25.8	25.3	37.4	37.4	52.5	63.4	65.5	64.5	57.5	50.5	38.4	28.7	46.4
<u>PRECIPITATION</u> (inches)													
TYE RIVER 1 S.E.	2.5	3.0	3.8	2.6	2.8	1.6	4.4	2.3	1.2	3.2	3.5	1.8	33.2
BIG MEADOWS	3.5	3.8	5.3	3.1	7.1	3.7	4.9	5.8	7.2	7.5	2.3	3.7	55.3

^aAdapted from U.S. Dept. of Commerce, Weather Bureau. Climatological Data (Annual Summaries 1961-1975 for Virginia). Vol. 62-81.

TABLE 2

Temperature extremes and freeze data
from Tye River 1 S.E. and Big Meadows^a

<u>TEMPERATURE EXTREMES</u> (°F)	VALUES
TYE RIVER 1 S.E.	
Extreme High (1970)	102.0
Average Annual High (1961-1975)	97.4
Average Annual Low (1961-1975)	5.9
Extreme Low (1963)	-1.0
BIG MEADOWS	
Extreme High (1974)	90.0
Average Annual High (1961-1975)	85.0
Average Annual Low (1961-1975)	-5.0
Extreme Low (1963 & 1970)	-11.0
<u>FREEZE DATA</u>	
TYE RIVER 1 S.E.	
Maximum Number of Frost Free Days (1973)	204
Average Number of Frost Free Days (1961-1975)	178
Minimum Number of Frost Free Days (1968)	151
BIG MEADOWS	
Maximum Number of Frost Free Days (1964)	161
Average Number of Frost Free Days (1961-1975)	143
Minimum Number of Frost Free Days (1963)	123

^aAdapted from U.S. Dept. of Commerce, Weather Bureau. Climatological Data (Annual Summaries 1961-1975 for Virginia). Vol. 62-81.

DESCRIPTION OF THE VEGETATION

The forests of the study area are located in the Oak-Chestnut Forest Region of the Deciduous Forest Formation as described by Braun (1950). The wide ranging genera Quercus, Acer, Fagus, and Tilia, and the somewhat more restricted Carya, Fraxinus, Ulmus, Betula, Liriodendron and Castanea characterize this formation in a broad sense (Braun 1950). The Oak-Chestnut forest, recognized by Braun (1950) as a climax association derived from the mixed Tertiary forest, contains Castanea dentata, Quercus prinus, Q. rubra, and Liriodendron tulipifera as common dominants. This forest region is diversified by inclusions of oak-hickory, oak-pine, and mixed oak forests, as well as the more meso-phytic cove communities (Braun 1950).

Chestnut blight (Endothia parasitica), which was well established in the central Blue Ridge by 1920 (Keever 1953), has slowly eliminated the American Chestnut (Castanea dentata) as a major community dominant. The forests of this region have not yet stabilized following the loss of this species. Keever (1953, 1973) reported a possible oak-hickory climax in the southern Blue Ridge, and a chestnut oak (Quercus prinus) forest in southeastern Pennsylvania as results of chestnut replacement. Nelson (1955) noted an increase in the basal area of Liriodendron tulipifera in a western North Carolina watershed, while Woods and Shanks (1959) as well as Stevenson (1974) reported the development of an "oak association-complex" with chestnut replacement in the Great Smokey Mountains and in western Virginia respectively. Glenn Johnson and

S. Ware (personal communication) believe that in the central Virginia Blue Ridge Carya ovalis is increasing in importance in chestnut oak forests as well as in those of northern red oak. The oak-hickory forests of the Piedmont lie fairly close to the mountains at this point, whereas the old oak-chestnut forests occupy wider areas of the Piedmont further north, and this could relate to the importance of Carya ovalis in the Peaks of Otter area of the Virginia Blue Ridge. Many more vegetational studies are needed to clarify the distribution of various forest types following chestnut replacement throughout its former range.

The Lesesne State Forest, located within the study area, is dedicated to the restoration of the American Chestnut to the forests of the Blue Ridge where it was once so important. Large populations of saplings from gamma-irradiated seeds as well as various American X Asiatic Chestnut species hybrids are maintained and studied in the area.

VEGETATIONAL METHODS

Brief qualitative and quantitative surveys were made of seven stands occupying various elevations and exposures within the study area: two occupying ridges, three on slopes and two in coves or draws. Quantitative data were obtained using a Spiegel Relaskop (angle gauge). Dominance was measured (square meters per hectare, cross sectional area breast height) by the Bitterlich method (Beers and Miller 1964). The relative dominance for each species in a stand was computed by division of each species' measured dominance by the total dominance of the stand. The density of each species (trees per hectare) was based on a stem count including all individuals in a circular plot (10 meter radius) having a four inch or greater diameter at breast height. Relative density values were computed from measured values as was done for relative dominance. Importance values (I.V.) were obtained by averaging relative dominance and relative density values. These methods were chosen because they obtain valuable plant ecological information in a rapid survey (Levy and Walker 1971). Qualitative descriptions of some of the more characteristic local community types follow the stand descriptions.

All taxonomic nomenclature in the following account follows Radford, Ahles, and Bell (1968).

VEGETATIONAL PATTERNS

The forests of the area are primarily second or third growth deciduous wooded uplands. Quantitative data were obtained for seven stands.

Stand 1 (Table 3), located on the mountain's crest along the Appalachian Trail at approximately 3950 feet (Fig. 1) was dominated by Quercus rubra (I.V. = 99.5). The general appearance was mesophytic; and stunted trees, many with double boles probably indicate ice damage from severe winter storms. Small numbers of Prunus serotina and Q. prinus were also present. A few individuals of Cornus alternifolia and Sorbus americana comprised the understory. Ribes rotundifolia and Dennstaedtia punctilobula were common throughout, with lesser numbers of Aster acuminatus and Solidago roanensis. Amianthium muscaetoxicum and Lilium superbum were locally abundant.

Stand 2 (Table 4) located on a wide ridge top at an elevation of 3000 feet (Fig. 1) was noticeably more rocky and xeric than Stand 1. This stand was dominated by Quercus alba (I.V. = 48.6) and Q. rubra (I.V. = 45.4) with some individuals of Q. prinus and Q. velutina also present. Small numbers of Acer saccharum occurred on the east slope. The shrub and herbaceous strata of this stand were noticeably depauperate in terms of both coverage and species diversity. A large number of chestnut (Castanea dentata) sprouts, an indication of that species' former importance in this stand were also noted. Aureolaria laevigata was fairly abundant; individuals of Solidago bicolor, S. roanensis,

TABLE 3
 VEGETATIONAL DATA - STAND 1
 Mesic Ridgetop at 3950 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Quercus rubra</u>	100.0%	99.0%	99.5%	██████████
<u>Prunus serotina</u>	0.0	1.0	0.5	1

Total Dominance = 27.33 meters square/hectare (cross-sectional area breast height)

Total Density = 1050.39 trees/hectare

TABLE 4
 VEGETATIONAL DATA - STAND 2
 Xeric Ridgetop at 3000 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Quercus alba</u>	47.8%	49.3%	48.6%	██████████
<u>Quercus rubra</u>	45.7	45.2	45.4	██████████
<u>Quercus prinus</u>	6.5	5.5	6.0	■

Total Dominance = 23.00 meters square/hectare (cross-sectional area
 breast height)

Total Density = 580.90 trees/hectare

Aster acuminatus, and A. undulatus were also present, as well as scattered plants of Carex spp.

Stand 3 (table 5) on a steep rocky, north to northeast facing slope at an altitude of 3000 feet (Fig. 1) was dominated by Betula lutea (I.V. = 38.31) and Quercus rubra (I.V. = 28.25). Tilia heterophylla (I.V. = 13.82) and Acer pensylvanicum (I.V. = 10.38) were the most common associate species, with smaller numbers of Carya cordiformis, Robinia psuedo-acacia, and A. saccharum present. Acer pensylvanicum, A. spicatum, Hamamelis virginiana, Viburnum acerifolium, Ilex montana, and scattered individuals of Kalmia latifolia formed the understory-shrub layer. The herbaceous layer was lacking excepting extensive moss colonization of loose boulders, and occasional colonies of Polypodium virginianum.

Stand 4 (Table 6) on a dry, rocky, west-facing slope, located above Harper's Creek at an elevation of 2000 feet (Fig. 1), was dominated by Quercus prinus (I.V. = 80.24). Q. rubra (I.V. = 9.12), and Carya glabra (I.V. = 6.8), were the most common associate species in this stand. Of lesser importance were Acer rubrum, Hamamelis virginiana, Liriodendron tulipifera and Cornus florida. Scattered colonies of Kalmia latifolia and Vaccinium vacillans dominated the limited shrub stratum, and individuals of Aureolaria laevigata, Geranium maculatum, Aster spp. , and Solidago spp. were noted in the herbaceous stratum.

Stand 5 (Table 7) was located on a mesic slope above the Tye River at an elevation of 1000 feet (Fig. 1). Liriodendron tulipifera (I.V. = 58.8) was the dominant species. Nyssa sylvatica, Carya glabra, Quercus rubra, Juglans nigra, Fraxinus americana, Acer rubrum, and Cercis canadensis were also present. Other species present, including

TABLE 5
 VEGETATIONAL DATA - STAND 3
 North-Northeast Slope at 3000 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Betula lutea</u>	36.0%	40.6%	38.3%	█
<u>Quercus rubra</u>	44.0	12.5	28.3	█
<u>Tilia heterophylla</u>	12.0	15.6	13.8	█
<u>Acer pensylvanicum</u>	2.0	18.8	10.4	█
<u>Carya cordiformis</u>	4.0	6.3	5.1	█
<u>Robinia pseudo-acacia</u>	2.0	3.1	2.6	█
<u>Acer saccharum</u>	0.0	3.1	1.6	█

Total Dominance = 25.00 meters square/hectare (cross-sectional area breast height)

Total Density = 254.65 trees/hectare

TABLE 6
 VEGETATIONAL DATA - STAND 4
 West Slope at 2000 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Quercus prinus</u>	80.8%	79.7%	80.2%	██████████
<u>Quercus rubra</u>	6.4	11.9	9.1	■
<u>Carya glabra</u>	8.5	5.1	6.8	■
<u>Acer rubrum</u>	2.1	0.0	1.1	┆
<u>Hamamelis virginiana</u>	2.1	0.0	1.1	┆
<u>Cornus florida</u>	0.0	1.7	0.9	┆
<u>Liriodendron tulipifera</u>	0.0	1.7	0.9	┆

Total Dominance = 31,34 meters square/hectare (cross-sectional area
 breast height)

Total Density = 625.99 trees/hectare

TABLE 7
 VEGETATIONAL DATA - STAND 5
 South to West Slope at 1000 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Liriodendron tulipifera</u>	64.8%	52.9%	58.8%	█
<u>Robinia pseudo-acacia</u>	8.5	8.7	8.6	█
<u>Nyssa sylvatica</u>	4.2	8.7	6.4	█
<u>Carya glabra</u>	5.6	6.7	6.2	█
<u>Sassafras albidum</u>	1.4	6.7	4.1	
<u>Quercus rubra</u>	4.2	2.9	3.6	
<u>Pinus virginiana</u>	4.2	2.9	3.6	
<u>Juglans nigra</u>	0.0	4.8	2.4	
<u>Fraxinus americana</u>	2.8	1.9	2.4	
<u>Juniperus virginiana</u>	2.8	1.9	2.4	
<u>Acer rubrum</u>	1.4	0.0	0.7	
<u>Pinus strobus</u>	0.0	1.0	0.5	
<u>Cercis canadensis</u>	0.0	1.0	0.5	

Total Dominance = 28.40 meters square/hectare (cross-sectional area
 breast height)

Total Density = 662.06 trees/hectare

Robinia pseudo-acacia, Sassafras albidum, Pinus virginiana, P. strobus, and Juniperus virginiana serve to illustrate the successional nature of this second or third growth stand. Species of Carya and Quercus were commonly observed in the seedling and sapling stages. Polystichum acrostichoides was the most characteristic herbaceous species present.

Stand 6 (Table 8) located in a north-northwest facing mesophytic cove at 3000 feet contains a seasonal stream (Fig. 1), and is apparently an old rockslide area dominated by large, scattered, hollow sugar maples. Acer saccharum (I.V. = 57.0) is the dominant species and Carya cordiformis (I.V. = 11.4), Betula lenta (I.V. = 9.8), and Quercus rubra (I.V. = 8.9) were common associates. Lesser numbers of Tilia heterophylla, Robinia pseudo-acacia, and Juglans nigra were also present. The shrub layer was essentially lacking, but a diverse and extensive herbaceous layer was present. Characteristic herbaceous species including Dennstaedtia punctilobula, Adiantum pedatum, Asplenium platyneuron, Arisaema triphyllum, Laportea canadensis, Anemone lancifolia, A. virginiana, Impatiens capensis, Lilium canadense, Trillium grandiflorum, Dicentra cucullaria, Cardamine concatenata, and Asarum canadense, along with trailing and reclining vines of Aristolochia macrophylla, were noted.

Stand 7 (Table 9) was located at 2000 feet in a south facing cove (Fig. 1) through which an occasionally summer-dry stream flows. Quercus prinus (I.V. = 43.3) was dominant. Fifteen other tree species were found in this community, including Q. rubra, Acer rubrum, Carya glabra, Liriodendron tulipifera, Robinia pseudo-acacia, Tilia heterophylla, and Ulmus rubra. The shrub layer was poorly developed excepting some individuals of Lindera benzoin, while a diverse herbaceous layer was present. Typical herbaceous species included Asarum canadense, Viola canadensis,

TABLE 8
 VEGETATIONAL DATA - STAND 6
 North-Northwest Cove at 3000 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Acer saccharum</u>	60.0%	54.0%	57.0%	██████████
<u>Carya cordiformis</u>	9.2	13.5	11.4	██
<u>Betula lenta</u>	6.1	13.5	9.8	██
<u>Quercus rubra</u>	12.3	5.4	8.9	██
<u>Tilia heterophylla</u>	6.2	5.4	5.8	██
<u>Robinia pseudo-acacia</u>	3.0	8.2	5.6	██
<u>Juglans nigra</u>	3.0	0.0	1.5	

Total Dominance = 21.64 meters square/hectare (cross-sectional area
 breast height)

Total Density = 196.37 trees/hectare

TABLE 9
 VEGETATIONAL DATA - STAND 7
 South Cove at 2000 feet

<u>Tree Species</u>	<u>Relative Dominance</u>	<u>Relative Density</u>	<u>Relative Importance</u>	<u>Value</u>
<u>Quercus prinus</u>	43.9%	42.6%	43.3%	█
<u>Quercus rubra</u>	12.3	5.6	9.0	█
<u>Acer rubrum</u>	7.0	9.3	8.2	█
<u>Carya glabra</u>	7.0	7.4	7.2	█
<u>Liriodendron tulipifera</u>	5.3	5.6	5.5	█
<u>Robinia pseudo-acacia</u>	3.5	5.6	4.6	█
<u>Tilia heterophylla</u>	1.8	5.6	3.7	█
<u>Ulmus rubra</u>	3.5	3.7	3.6	█
<u>Nyssa sylvatica</u>	5.3	0.0	2.7	█
<u>Ostrya virginiana</u>	0.0	3.7	1.9	
<u>Cornus florida</u>	0.0	3.7	1.9	
<u>Betula lenta</u>	1.8	1.6	1.7	
<u>Carya tomentosa</u>	1.8	1.6	1.7	
<u>Quercus alba</u>	1.8	1.6	1.7	
<u>Platanus occidentalis</u>	1.8	1.6	1.7	
<u>Quercus velutina</u>	1.8	0.0	0.9	

Total Dominance = 28.50 meters square/hectare (cross-sectional area
 breast height)

Total Density = 429.68 trees/hectare

V. eriocarpa, V. papilionacea, V. palmata, Dicentra cucullaria and D. eximia.

Although insufficient data were taken to state specific vegetational patterns and their controlling factors within the area, some broad comparisons can be drawn to other more detailed studies concerning the vegetation of this general area. Oaks, whether or not they are a primary species in chestnut replacement, were present in every stand sampled. The consistent importance of Quercus spp. in communities of both slopes and ridges (with the exception of Stand 5) was also found by Johnson and Ware (personal communication) in the Peaks of Otter area. The change from high importance of northern red oak in more mesic habitats and higher elevations, to increased importance of chestnut oak on lower and more xeric sites as described by Braun (1950) and Whittaker (1956) is a general trend in this region. Stand 2 correlates well with Whittaker's (1956) findings of the importance of white oak in the Great Smokies at elevations above 4500 feet if the altitude and latitude relationships are considered.

Betula lutea (Stand 3) and B. lenta (Stands 6 & 7) are reported as important species in the Blue Ridge by Braun (1950) and by Johnson and Ware (personal communication). Stand 5, although not yet stabilized, indicates some of the importance of tuliptree in successional stands in the Blue Ridge as noted by Braun (1950) and Johnson and Ware (personal communication).

Stands 6 and 7 show two expected patterns for coves from the more mesophytic type characterized by sugar maple, basswood and red oak (Stand 6), as discussed by Braun (1950), to the more xeric red and

chestnut oak-containing coves (Stand 7), some of which occur in the Peaks of Otter area (Johnson and Ware, personal communication).

In addition to the seven general community types quantitatively sampled (northern red oak, white oak, northern hardwoods, chestnut oak, moist cove, dry cove, and successional), many other local and more restricted communities are found within the area.

The ericaceous shrub community is widely distributed throughout the area, occurring primarily on thin soils overlying or surrounding bedrock outcroppings and along ridges in either mixed deciduous and/or pine woodlands. This community is characterized by Kalmia latifolia, Rhododendron catawbiense, R. nudiflorum, Vaccinium vacillans, V. stamineum, Gaylussacia baccata and Menziesia pilosa. Herbaceous species including Polypodium virginianum, Cypripedium acaule and Carex spp. were occasionally found in these communities, which typically support little herbaceous growth.

Exposed rock cliffs and ledges were found in many locations within the study area. These habitats included species of the ericaceous shrub community mentioned above and often a few individuals of Pinus pungens or Crataegus spp. also surround these areas. Calamagrostis porteri, Asplenium montanum, A. pinnatifidum, Polypodium virginianum, Sedum telephioides, Selaginella rupestris, Dicentra eximia and Corydalis sempervirens were some of the herbaceous species collected in this type of habitat.

Two small granitic rock outcrops were noted within the area; these support a characteristic herbaceous vegetation including Talinum teretifolium, Portulaca oleracea and Carex muhlenbergii. These species were found growing directly on the outcrops. Both outcrops were also

noted to have individuals of Pinus virginiana, Chionanthus virginicus, Smilax spp. and Rubus spp. bordering them.

Two small areas with a high importance of Tsuga canadensis were noted, both on slopes above streams. In addition, two other small areas were found, located on alluvial flats or benches along streams where Fagus grandifolia was a primary component of the overstory. The occurrence of these areas may be related to the presence of unique microclimatic determinants, as expressed by Nemeth (1973).

Disturbed areas excepting the usual weedy roadsides, old homesites, and old-field communities were not commonly encountered. At least three abandoned apple orchards in various stages of succession were noted on the mountain, and were mentioned earlier. Two other communities reflecting past severe disturbance were found, one consisting of an almost pure stand of Robinia pseudo-acacia with a dense shrub layer of Symphoricarpus orbiculatus, and a stand of Pinus virginiana with a few individuals of P. pungens and P. rigida. Both of these areas may owe their present composition to severe burns in the past as discussed by Allard (1943) for Bull Run Mountain, and Zobel (1969) for the Appalachian region in general.

FLORISTIC METHODS AND
DISTRIBUTION RECORDS

Collection of specimens from Three Ridges Mountain began in March 1976 and continued until mid-October 1976. Other trips were taken in late October 1976 and during the early spring 1977. Collecting trips were made at weekly intervals. Location, abundance and habitat were noted for each number. Species abundance was noted as abundant, common, occasional, uncommon or rare. A complete set of voucher specimens has been deposited in the Herbarium of the College of William and Mary. Duplicate specimens will be exchanged with other herbaria, primarily in the Southeast.

Radford, Ahles, and Bell (1968) was the primary manual used for identification of specimens. Fernald (1950), Gleason and Cronquist (1963), Gould (1975), Hitchcock (1950), Strausbaugh and Core (1964-1971), Bailey (1949), and Gleason (1952) were the other manuals used for identifications. Nomenclature and common names follow Radford, Ahles, and Bell (1968) except for plants not occurring within the range of that manual, in which case Fernald (1950) was followed. Nomenclature for the genus Dichanthelium follows Gould (1975).

Determination of distributional records follows three sources. For the Pteridophyta, Coniferophyta, and Monocotyledoneae the records follow the newly published Atlas of the Virginia Flora, part I, Pteridophytes through Monocotyledons (Harvill, Stevens, and Ware 1977). The data for the Dicotyledons follows two sources: Massey's Virginia

Flora (1961), and the three papers by Freer (1950, 1958, 1968) on the vascular plants of the central Blue Ridge Mountains of Virginia.

A total of 571 species representing 342 genera of 97 families of vascular plants has been recorded for Three Ridges Mountain. Two hundred seventy three of these species have not been mentioned in the earlier botanical literature dealing with Nelson County. In the annotated checklist these species are preceded by an asterisk (*) denoting them as county records.

Calystegia sericata (House) Bell, is preceded by a double asterisk (**) denoting a species not previously reported as occurring in the state of Virginia. A single collection of this species was made in an old field at the north end of the Lesesne State Forest. This species was previously known only from limited collections along the western North Carolina-South Carolina border and from a few locations in Georgia.

Spiranthes ovalis Lindley was collected from a small colony growing above the Tye River along the Appalachian Trail (A.T.). This colony was located on a successional wooded slope and may possibly be the northernmost record of this species.

Other species of uncommon occurrence, although not comprising physiographic records, included Parietaria pensylvanicum Muhl. ex Willd., Solidago uliginosa Nuttall, Agastache nepetoides (L.) Kuntze, and Chenopodium standleyanum Allen.

A collection of Habenaria viridis var. bracteata (Muhl. ex Willd.) Gray, was also made in Nelson County (Watson, 1173); however, the collection was not made within the study area proper.

TABLE 10
SUMMARY OF THE TAXA

	FAMILIES	GENERA	SPECIES
PTERIDOPHYTA	9	15	28
CONIFEROPHYTA	2	3	7
ANTHOPHYTA			
MONOCOTYLEDONEAE	12	69	123
DICOTYLEDONEAE	74	255	413
TOTALS	97	342	571

ANNOTATED CHECKLIST

PTERIDOPHYTA

ASPIDIACEAE

- Athyrium asplenioides (Michaux) A. A. Eaton, Southern Lady Fern. Common; streambanks and mesic wooded slopes; (446, 919).
- A. thelypteroides (Michaux) Desvaux, Silvery Spleenwort. Locally common; mesic slopes and coves; (834).
- Cystopteris protrusa (Weatherby) Blasdell, Spreading Bladder Fern. Occasional; mesic slopes and coves; (334).
- Dryopteris intermedia (Willd.) Gray, Fancy Fern. Common; rocky slopes, generally in shaded areas; (240, 920).
- D. marginalis (L.) Gray, Marginal Shield Fern. Abundant; wooded slopes throughout; (2).
- D. spinulosa (Mueller) Watt, Spinulose Woodfern. Uncommon; wet, wooded areas; (900).
- Polystichum acrostichoides (Michaux) Schott, Christmas Fern. Abundant; wooded areas throughout; (1082).
- Thelypteris hexagonoptera (Michaux) Weatherby, Broad Beech-Fern. Occasional; mesic, wooded slopes; (1034).
- T. noveboracensis (L.) Nieuwland, New York Fern. Common in mesic deciduous woods; (828).
- Woodsia obtusa (Sprengel) Torrey, Blunt-lobed Woodsia. Occasional; wet woodland margins and seepage areas; (880).

ASPLENIACEAE

- Asplenium montanum Willd., Mountain Spleenwort. Uncommon; shaded cracks among rocks of steep cliffs; (903a).
- A. pinnatifidum Nuttall, Lobed Spleenwort. Rare; growing in cracks among exposed granitic rocks; (903b).

A. platyneuron (L.) Oakes, Ebony Spleenwort. Common; wooded areas throughout; (360).

A. trichomanes L., Maidenhair Spleenwort. Occasional; cracks in shaded rocks; (68a).

BLECHNACEAE

Woodwardia areolata (L.) Moore, Netted Chain-Fern. Uncommon; wet wooded areas and thickets; (447).

LYCOPODIACEAE

Lycopodium flabelliforme (Fernald) Blanchard, Running Pine. Common; pine woods and successional woodlands; (1009).

L. lucidulum Michaux, Shining Clubmoss. Uncommon; streambanks and wet, wooded areas; (692).

L. obscurum L., Ground Pine. Occasional; successional woods; (24).

OPHIOGLOSSACEAE

Botrychium dissectum Sprengel, Common Grapefern. Occasional; dry thickets and successional woods; (821).

*B. oneidense (Gilbert) House, Blunt-lobed Grapefern. Rare; dry, wooded thickets; (1049).

B. virginianum (L.) Schwartz, Rattlesnake Fern. Common; successional woods and woodland margins throughout; (203, 1048).

OSMUNDACEAE

Osmunda cinnamomea L., Cinnamon Fern. Occasional; low woods and streambanks; (193).

O. claytoniana L., Interrupted Fern. Uncommon; low woods and streambanks; (289).

O. regalis var. spectabilis (Willd.) Gray, Royal Fern. Uncommon; wet, wooded thickets; (577).

POLYPODIACEAE

Polypodium virginianum L., Rock Cap Fern. Locally abundant; colonizing open rocks throughout; (1).

PTERIDACEAE

Adiantum pedatum L., Maidenhair Fern. Common; mesic slopes and coves; (423).

Dennstaedtia punctilobula (Michaux) Moore, Hay-Scented Fern. Locally abundant; rocky, deciduous wooded slopes and ridges; (679).

SELAGINELLACEAE

Selaginella rupestris (L.) Spring, Rock Spikemoss. Uncommon; rock ledges and cliffs in exposed locations; (394).

CONIFEROPHYTA

CUPRESSACEAE

Juniperus virginiana L., Red Cedar. Locally abundant; old fields, woodland margins and roadsides throughout; (46).

PINACEAE

*Pinus echinata Miller, Short-Leaf Pine. Uncommon; mixed pine woods; (924).

P. pungens Lambert, Table Mountain Pine. Occasional; rock cliffs as well as dry, open woods; (30).

P. rigida Miller, Pitch Pine. Rare; scattered individuals in successional woods; (1013, 1032).

P. strobus L., White Pine. Common; scattered individuals throughout; (697).

P. virginiana Miller, Scrub Pine. Abundant; successional woods, woodland margins and old fields; (470).

Tsuga canadensis (L.) Carr., Canada Hemlock. Occasional; wooded slopes above streams; (951).

ANTHOPHYTAMONOCOTYLEDONEAE

ALISMATACEAE

Sagittaria latifolia Willd. var. pubescens (Muhl.) J.G. Smith, Wapato, Duck-Potato. One small colony in a seepage area at the head of the unnamed boundary stream, ca. 2500 ft.; (886).

AMARYLLIDACEAE

*Narcissus pseudo-narcissus L., Daffodil. Occasional; escaped or persisting from cultivation, old homesites and streambanks; (23).

ARACEAE

Arisaema triphyllum (L.) Schott, Jack in the Pulpit. Common; mesic coves and streambanks throughout; (101, 378).

Symplocarpus foetidus (L.) Nuttall, Skunk Cabbage. One colony in an extensive seepage area along the unnamed western boundary stream, ca. 2500 ft.; (12).

COMMELINACEAE

Commelina communis L. Common; old homesites and waste places; (480, 505).

*Tradescantia subaspera Ker. Uncommon; disturbed areas in the Lesesne State Forest; (263).

T. virginiana L. Uncommon; deciduous woods along the A.T. near Chimney Rock; (154).

CYPERACEAE

Bulbostylis capillaris (L.) Clarke. Uncommon; growing in the area surrounding an outcrop adjacent to the A.T., above the Tye River; (909).

Carex aestivalis M.A. Curtis. Common; mesic, wooded slopes at higher elevations; (816).

*Carex blanda Dewey. Occasional; thinly wooded slopes in rocky woods; (931).

C. cephalophora Muhl. ex Schkuhr. Rare; growing on a rock outcrop above the Tye River, adjacent to the A.T.; (908b).

- C. crinita Lam. var. gynandra (Schweinitz) Schweinitz and Torrey. Common; disturbed areas, usually around water; (440).
- C. laxiflora Lam. Occasional; mesic deciduous woods; (547).
- C. lurida Wahlenberg. Locally common; wet woodland margins in the Lesesne State Forest; (585).
- C. muhlenbergii Schkuhr. Rare; rock outcrop adjacent to the A.T. above the Tye River; (908a).
- C. normalis Mackenzie. Common; wooded areas throughout; (565).
- C. pennsylvanica Lam. Occasional; rocky woods, primarily at higher elevations; (342).
- C. platyphylla Carey. Rare; dry, rocky area adjacent to intermittent stream at the south boundary of the Lesesne State Forest; (43).
- C. prasina Wahlenberg. Occasional; streambanks in mesic woods; (512).
- C. rosea Schkuhr. Abundant; throughout rocky, deciduous wooded areas; (338, 930).
- C. scabrata Schweinitz. Occasional; open, wet areas along streams; (586).
- *C. stipata Muhl. ex Schkuhr. Occasional; open, wet areas along streams; (247).
- C. swanii (Fernald) Mackenzie. Occasional; old homesites and fields; (506).
- C. virescens Muhl. ex Schkuhr. Common; throughout rocky woods; (313).
- C. vulpinoidea Michaux. Common; old fields, orchards and roadsides; (398).
- *Cyperus retrofractus (L.) Torrey. Occasional; old fields and orchards; (397).
- *C. strigosus L. Locally common; wet fields and open seepage areas; (843).
- Eleocharis obtusa (Willd.) Schultes, Spike-rush. Common; wet fields and roadsides; (753, 953).
- *Scirpus polyphyllus Vahl., Bullrush. Locally common; wet areas in open fields; (368).

DIOSCOREACEAE

*Dioscorea batatas Dcne., Cinnamon Vine. Rare; one colony at an old homesite along Harper's Creek, ca. 1600 ft.; (776).

D. villosa L., Wild Yam. Common; wooded areas throughout; (129, 302).

IRIDACEAE

Belamcanda chinensis (L.) DC., Blackberry Lily. Locally abundant along Rt. 680 by an old homesite south of the Lesesne State Forest; (356, 479, 724).

Iris germanica L., Garden Iris. Common; persisting at old homesites throughout; (254).

Sisyrinchium angustifolium Miller, Blue-eyed Grass. Occasional; roadsides, orchards and old homesites; (171, 241).

JUNACEAE

*Juncus dudleyi Wiegand. Occasional; open streambanks; (268).

*J. effusus L. Common; wet, open areas throughout; (267, 233).

*J. platyphyllus (Wiegand) Fernald. Uncommon; streambanks; (991).

*J. subcaudatus (Engelm) Colville & Blake. Occasional; wet woodland margins; (844).

J. tenuis Willd., Path Rush. Common; woodland margins; (376, 427).

Luzula echinata (Small) Hermann, Woodrush. Common; mesic woodlands throughout; (1064).

LILIACEAE

*Allium canadense L., Wild Onion. Common; old fields and roadsides; (520).

*A. vineale L., Field Garlic. Abundant; roadsides, fields and waste areas throughout; (195, 372).

Amianthium muscaetoxicum (Walter) Gray, Fly Poison. Occasional; mesic woods at higher elevations; (327).

Clintonia umbellulata (Michaux) Morong, Speckled Wood-Lily. Occasional; wooded streambanks; (191, 291).

*Hemerocallis fulva L., Daylily. Locally abundant; old homesites, roadsides and waste areas; (232).

Lilium canadense L., Canada Lily, Wild Yellow Lily. Rare; one individual on north slope of a cove along the A.T., ca. 3200 ft.; (391).

L. superbum L., Turk's-cap Lily. Locally common; level area along the A.T. at the summit; (558, 559).

Medeola virginiana L., Indian Cucumber-root. Common; mesic, wooded slopes throughout; (185).

Melanthium parviflorum (Michaux) Watson, Hellebore. Occasional; wet, rocky seepage areas; (538).

*Ornithogalum umbellatum L., Star of Bethlehem. Uncommon; old homesites; (116).

Polygonatum biflorum (Walter) Ell., Solomon's Seal. Common; mesic woods throughout; (113, 318).

*P. pubescens (Willd.) Pursh, Solomon's Seal. Occasional; mesic coves and slopes; (1060).

Smilacina racemosa (L.) Desf., False Solomon's-seal. Common; wooded areas throughout; (112).

*Smilax glauca Walter. Common; wooded areas; (351, 627).

S. herbacea L. Common; mesic woods and coves; (317, 563, 969).

S. hispida Muhl. Uncommon; rocky slopes in dry woods; (319).

S. rotundifolia L. Abundant; mesic woods and streamside thickets; (126, 578).

Trillium erectum L., Wake Robin, Red Trillium. Rare; one small colony growing along the unnamed western boundary stream, ca. 2200 ft.; (248, 297).

T. grandiflorum (Michaux) Salisbury. Common; occurring in large colonies in cove forests and on mesic slopes; (88).

Uvularia perfoliata L. Abundant; wooded areas throughout; (106).

U. sessilifolia L. Uncommon; mesic slopes and coves; (307).

Veratrum viride Aiton, White Hellebore, Indian Poke. Locally common; seepage areas, streambanks and mesic coves; (244).

ORCHIDACEAE

Corallorhiza maculata Raf., Spotted Coral Root. Rare; edge of Campbell's Creek, ca. 2300 ft.; (537).

C. odontorhiza (Willd.) Nuttall, Autumn Coral-root. Uncommon; deciduous wooded streambanks; (1047).

Cypripedium acaule Aiton, Pink Moccasin Flower. Occasional; scattered throughout deciduous woods and ericaceous shrub communities; (98).

C. calceolus var. pubescens (Willd.) Correll, Yellow Lady's Slipper. Rare; a few specimens along the A.T. just south of Reed's Gap; (234).

Goodyera pubescens (Willd.) R. Brown, Downy Rattlesnake Plantain. Occasional to locally abundant; mesic woods and streambanks throughout, often associated with ericaceous shrubs; (498, 536).

Habenaria clavellata (Michaux) Sprengel, Small Green Wood-orchid. Uncommon; seepage areas and streambanks; (910).

*H. psycodes (L.) Sprengel, Small Purple Fringed-orchid. Rare; one individual along Campbell's Creek at ca. 2300ft.; (300).

Isotria verticillata (Muhl. ex Willd.) Raf., Large Whorled Pogonia. Uncommon; seepage areas and streambanks; (306, 928).

Orchis spectabilis L., Showy Orchis. Locally abundant; one large colony behind Evergreen Church along Rt. 687 in beech woods; (218, 1079).

Spiranthes cernua (L.) Richard, Nodding Ladies' Tresses. Rare; one individual growing along a streambank across from the entrance to Wintergreen along Rt. 664; (1029).

*Spiranthes ovalis Lindley, Lesser Ladies' Tresses. Rare; a few individuals in a successional forest along the A.T. above the Tye River, ca. 1000 ft.; (1020).

Tipularia discolor (Pursh) Nuttall, Crane-fly Orchid. Uncommon; Successional oak-pine woods at lower elevations; (1070).

POACEAE

Agropyron repens (L.) Beauvois, Quack Grass. Occasional; old fields and homesites; (527b).

Agrostis perennans (Walter) Tuckerman. Abundant; wooded areas throughout; (507, 615).

A. stolonifera L., Redtop. Common; old fields and roadsides; (601).

- *Andropogon scoparius Michaux, Little Bluestem. Common; old fields, orchards and homesites; (556, 883).
- Arrhenatherum elatius (L.) Presl., Common; old fields and roadsides; (231, 789).
- Brachyelytrum erectum (Schreber) Beauvois. Occasional; mesic woods and streambanks; (540).
- Bromus commutatus Schrader. Common; old fields and roadsides; (196).
- B. purgans L. Common; mesic woods and along streams; (425, 804).
- *B. tectorum L. Common; roadsides, fields and homesites; (260).
- Calamagrostis porteri A. Gray. Occasional; in thin soils around rock outcroppings at higher elevations; (328, 567).
- *Cinna arundinacea L. Common; wet areas in old fields and along open streambanks; (538, 985).
- Dactylis glomerata L., Orchard Grass. Locally abundant; old fields and abandoned apple orchards; (367, 575).
- Danthonia spicata (L.) Beauvois ex R. & S. Common; old fields and orchards; (315, 428).
- *Dichanthelium clandestinum (L.) Gould. Common; old fields and open deciduous woods; (495, 579).
- D. depauperatum (Muhl.) Gould. Occasional; exposed rocks in dry woods; (557).
- D. dichotomum (L.) Gould. Occasional; open areas in mesic woods; (549).
- D. lanuginosum (Elliott) Gould.
var. lanuginosum Common; old fields and open woods; (438, 897).
var. villosissimum (Nash) Gould. Occasional; old fields; (950).
- D. latifolium (L.) Gould. Uncommon; open, wooded slopes; (290, 929).
- D. ravenelii (Scribner) Gould. Occasional; dry deciduous woods; (550, 838).
- *Digitaria ischaemum (Schreber) Schreber ex Muhl. var. ischaemum.
Common; old homesites, roadsides and waste places; (996, 1030).
- *D. sanguinalis (L.) Scopoli. Occasional; old homesites, fields, roadsides and waste places; (600).

*Echinochloa crusgalli (L.) Beauvois, Barnyard Grass. Occasional; roadsides and waste places; (603, 873).

Eleusine indica (L.) Gaertner, Goose Grass. Occasional; old fields, roadsides and orchards; (642).

*Eragrostis capillaris (L.) Nees. Common; old fields and roadsides; (741).

E. cilianensis (All.) Lutati, Stink Grass. Common; old fields and waste places; (643, 884).

*E. hirsuta (Michaux) Nees. Uncommon; old fields, orchards and roadsides; (588).

*E. pilosa (L.) Beauvois. Common; old fields and roadsides; (602, 644).

*E. spectabilis (Pursh) Steudel. Common; old fields and orchards; (609).

Festuca elatior L. Common; old fields, orchards and waste places; (618).

F. obtusa Biehler. Abundant; open and disturbed habitats throughout; (252, 511).

Glyceria melicaria (Michaux) Hubbard. Occasional; mesic woods and streambanks; (430).

Holcus lanatus L., Velvet Grass. Common; old fields, orchards and roadsides; (262, 377).

Hystrix patula Moench, Bottlebrush Grass. Occasional; roadsides and mesic woods; (467, 488).

*Leersia virginica Willd. Uncommon; low fields and wet, open roadsides; (740, 863).

✓ Lolium multiflorum Lam. Occasional; open deciduous woods and roadsides; (812, 1038).

*Muhlenbergia schreberi J. F. Gmelin. Common; old fields, roadsides and waste places; (864).

M. tenuiflora (Willd.) BSP. Common; deciduous wooded areas throughout; (564, 960).

*Panicum dichotomiflorum Michaux. Occasional; roadsides and thinly wooded areas; (755, 874).

Phleum pratense L., Timothy. Common; old fields, orchards and roadsides; (533).

Poa compressa L. Occasional; old fields, homesites and roadsides; (444, 620).

P. pratensis L. Abundant; old fields, roadsides and waste places throughout; (805, 532).

Secale cereale L., Rye. Rare; a doubtfully established escape from cultivation; collected by old building along the A.T. by Maupin Fields shelter; (312).

Setaria faberi W. Herrman. Common; roadsides, homesites and waste places; (476, 607).

*S. glauca (L.) Beauvois. Occasional; old homesites and waste places; (749b).

*S. viridis (L.) Beauvois. Occasional; old homesites and waste places; (794a, 882).

Sphenopholis nitida (Biehler) Scribner. Occasional; open oak woods; (181).

Tridens flavus (L.) Hitchcock var. flavus, Purple Top. Abundant; roadsides, orchards and old fields throughout; (477, 1051).

TYPHACEAE

*Typha latifolia L., Common Cat-tail. Uncommon; low, wet, boggy areas along roadsides; (483).

DICOTYLEDONEAE

ACERACEAE

Acer pensylvanicum L., Striped Maple. Common; rocky, wooded slopes at higher elevations; (100, 976).

A. rubrum L., Red Maple. Common; mesic, wooded areas throughout; (1007).

A. saccharum Marshall, Sugar Maple. Locally common; mesic slopes and coves; (1081).

A. spicatum Lam., Mountain Maple. Locally common; rocky, deciduous wooded slopes at higher elevations; (152).

AMARANTHACEAE

*Amaranthus hybridus L., Pigweed. Occasional; fields, orchards, and waste places; (944).

*A. spinosus L., Thorny Amaranth. Occasional; fields, orchards, and waste places; (1024).

ANACARDIACEAE

*Rhus copallina L., Dwarf Sumac. Locally abundant; old field margins and waste places, primarily within the Lesesne State Forest; (608).

R. glabra L., Smooth Sumac. Locally abundant; old fields and woodland margins; (496, 735).

*R. radicans L., Poison Ivy. Abundant throughout the area; (141b).

R. typhina L., Staghorn Sumac. Locally abundant; woodland margins, old fields, homesites, and orchards; (373).

APIACEAE

*Cicuta maculata L., Water Hemlock. Occasional; low fields and open streambanks; (626).

*Cryptotaenia canadensis (L.) DC., Honewort. Locally common; wet fields and open streambanks; (433, 771).

*Daucus carota L., Wild Carrot, Queen Anne's Lace. Abundant; roadsides, fields, and waste places throughout; (365).

*Osmorhiza claytonii (Michaux) Clarke, Sweet Cicely, Anise-root. Uncommon; mesic deciduous woods and streambanks; (153, 158).

*Oxypolis rigidior (L.) Raf. Uncommon; open, wet woods; (890).

*Sanicula canadensis L., Snakeroot. Occasional; old fields and roadsides; (207).

Taenidia integerrima (L.) Drude, Golden Alexander. Common; around exposed rocks in deciduous woods; (155, 321).

Thaspium barbinode (Michaux) Nuttall, Meadow Parsnip. Common; throughout deciduous wooded areas; (62, 308).

Zizia aptera (Gray) Fernald, Meadow Parsnip. Occasional; deciduous wooded slopes; (89).

APOCYNACEAE

*Apocynum androsaemifolium L. Common; open, rocky slopes and roadsides; (380, 648).

*A. cannabinum L. Common; old fields, orchards and waste places; (221).

*Vinca minor L., Periwinkle. Common; old homesites and waste places; one very large colony was noted in a successional forest area along Rt. 680 just north of the Lesesne State Forest; (10).

AQUIFOLIACEAE

Ilex ambigua (Michaux) Torrey var. montana (T. & G.) Ahles, Mountain Holly, Mountain Winterberry. Uncommon; mesic deciduous woods at higher elevations; (1019).

I. verticillata (L.) Gray, Black Alder, Winterberry. Occasional; shaded streambanks in deciduous wooded areas; (703).

ARALIACEAE

Aralia nudicaulis L., Wild Sarsaparilla. Uncommon; shaded slopes above streams in mesic deciduous woods; (131).

A. racemosa L., Spikenard. Common; mesic deciduous woods and wooded streambanks; (545, 871).

*Hedera helix L., Ivy. Locally common; persisting around old homesites; (223).

*Panax quinquefolium L., Ginseng. Uncommon; mesic woods and streambanks; (486, 701).

ARISTOLOCHIACEAE

Aristolochia macrophylla Lam., Dutchman's Pipe. Locally common; one large colony in a northwest-facing cove along the A.T. at about 3200 ft.; (105, 145).

*A. serpentaria L. Occasional; low woods and streambanks, scattered individuals along the Tye River adjacent to the A.T.; (902).

Asarum canadense L., Wild Ginger. Locally common; mesic deciduous woods, coves and streambanks; (349, 1059).

ASCLEPIADACEAE

Asclepias exaltata L., Poke Milkweed. Common; throughout open, deciduous wooded areas; (310, 383).

A. quadrifolia Jacquin. Occasional; along low roadsides and open streambanks; (138, 176).

A. syriaca L., Common Milkweed. Common; old fields, orchards and roadsides throughout; (497).

- A. tuberosa L., Butterfly-weed. Occasional; old fields, roadsides and waste places; (281, 405).
- *A. verticillata L. Occasional; old fields, orchards, and homesites; (494).
- *Matelea carolinensis (Jacquin) Woodson. Rare; one small colony growing along a wooded roadside in the Lesesne State Forest; (201).

ASTERACEAE

- *Achillea millefolium L., Milfoil. Abundant; roadsides, old fields and waste places throughout; (197, 548).
- *Ambrosia artemisiifolia L. Abundant; woodland margins and waste places; (635).
- *A. trifida L. Common; woodland margins and waste places throughout; (685, 866).
- Antennaria plantaginifolia (L.) Richardson. Common; open woods; (50).
- *Anthemis arvensis L. Occasional; roadsides and waste places; (140).
- *Arctium minus (Hill) Bernh. Common; old fields, orchards and waste places; (783, 849).
- *Aster acuminatus Michaux. Abundant; deciduous wooded areas and open slopes; (818, 915).
- *A. cordifolius L. Occasional; rocky, deciduous wooded slopes; (965).
- A. divaricatus L., Heart-leaved Aster. Common; throughout wooded areas and woodland margins; (614, 669).
- A. infirmus Michaux. Occasional; scattered throughout deciduous wooded areas; (854).
- A. macrophyllus L. Common; mesic deciduous woods and streambanks; (531, 825).
- A. patens Aiton. Occasional; wooded areas; (835, 939).
- *A. paternus Cronquist, White-topped Aster. Common; wooded roadsides and open woods; (443).
- *A. pilosus Willd. var. pilosus, Frost Aster. Common; low areas in old fields and wooded streambanks; (848, 1041).
- A. puniceus L. Common; low woods, streambanks, and wet areas in fields; (842, 889).

- A. undulatus L. Common; wooded areas throughout; (913, 937).
- *Bidens bipinnata L., Spanish Needles. Locally abundant; woodland margins and waste places; (932, 948).
- *B. tripartita L. Locally common; open, wet habitats throughout; (987).
- B. vulgata Greene. Locally common; open, wet habitats throughout; (845, 945).
- *Carduus discolor (Muhl. ex Willd.) Nuttall. Common; old fields and orchards; (665, 979).
- *Centaurea maculosa Lam. Common; old fields, orchards and roadsides; (362, 454).
- Chrysanthemum leucanthemum L., Ox-eye Daisy. Abundant; old fields, orchards, roadsides and waste places throughout; (211).
- *Cichorium intybus L., Chicory. Common; roadsides and waste places throughout; (468, 651).
- *Coreopsis verticillata L. Occasional; open woods and wooded roadsides; (251, 451).
- *Elephantopus carolinianus Willd. Occasional; wet roadsides and old fields; (706).
- *Erigeron annuus (L.) Persoon, Daisy Fleabane. Common; old fields, roadsides and waste places; (205, 730).
- *E. canadensis L. var. canadensis. Horseweed. Common; old fields, roadsides and waste places; (633).
- *E. strigosus Muhl. ex Willd., Daisy Fleabane. Common; old fields and waste places; (410, 464).
- Eupatorium perfoliatum L., Boneset. Occasional; old field margins and open woods; (728).
- *E. purpureum L. Common; open deciduous woods; (560, 699).
- E. rugosum Houttuyn. Common; streambanks and mesic woods; (617, 839).
- Galinsoga ciliata (Raf.) Blake, Peruvian Daisy. Abundant; old fields, roadsides and waste places; (369, 589).
- Gnaphalium obtusifolium L., Rabbit Tobacco, Everlasting. Common; old fields, roadsides and waste places; (736).
- Helianthus decapetalus L. Common; throughout mesic deciduous woods; (916).

- H. divaricatus L. Common; scattered colonies throughout the area; (384, 514).
- Heliopsis helianthoides (L.) BSP., Ox-eye. Common; old fields, roadsides and deciduous woods; (352, 416).
- *Hieracium paniculatum L. Common; wooded roadbanks and open deciduous woods; (673, 836).
- *H. pilosella L., Mouse-ear. Occasional; old fields and roadsides; (277, 662).
- H. pratense Tausch, King Devil. Abundant; open wooded slopes throughout; (123, 274).
- H. venosum L., Rattlesnake-weed. Abundant; roadbanks, open fields and deciduous woods throughout; (115, 837).
- Lactuca biennis (Moench) Fernald, Wild Lettuce. Occasional; open woods and woodland margins; (746, 987).
- *L. canadensis L., Wild Lettuce. Common; old field margins and waste places; (401, 596).
- *L. floridana (L.) Gaertner, Wild Lettuce. Occasional; roadsides and waste places; (683, 877).
- Lapsana communis L., Nipplewort. Common; roadsides and waste places; (214, 465).
- Liatris graminifolia Willd. Occasional; woodland margins and roadsides in full sun; (963).
- Polymnia canadensis L. Uncommon; roadsides and open woods; (326).
- Prenanthes altissima L. Occasional; mesic deciduous woods; (964).
- *Pyrrhopappus carolinianus (Walter) DC. Occasional; roadsides and streambanks; (458).
- *Rudbeckia hirta L., Black-eyed Susan. Locally abundant; roadsides, old fields and waste places throughout; (288).
- R. laciniata L., Coneflower. Abundant; low fields, open streambanks and wooded areas; (892).
- Senecio aureus L. Common; woodland margins and open wet woods; (107).
- *S. obovatus Muhl. ex Willd. Occasional; scattered individuals throughout wooded areas; (125).
- S. smallii Britton. Common; old fields, orchards and roadsides; (343).

- Solidago altissima L. Common; old fields, orchards and roadsides; (800).
- *S. arguta Aiton. Common; wooded and open areas throughout; (676, 832).
- S. bicolor L., Silverrod. Common; open, wooded slopes throughout; (810).
- S. curtisii T. & G. Abundant; deciduous wooded areas throughout; (801).
- S. erecta Pursh. Common; rocky, wooded slopes; (811).
- *S. gigantea Aiton. Common; woodland margins and open wooded areas; (852).
- *S. juncea Aiton. Common; old fields, roadsides and open wooded areas throughout; (594, 875).
- S. nemoralis Aiton. Common; old fields, roadsides and waste places; (806).
- *S. roanensis Porter. Common; wooded areas; streambanks and waste places; (452).
- S. uliginosa Nuttall. Rare; a few individuals growing along Campbell's Creek, ca. 1500 ft.; (777).
- *Taraxacum officinale Wiggers, Common Dandelion. Abundant; open areas throughout; (1081).
- *Tragopogon dubius Scopoli. Uncommon; scattered individuals in an old field at Reed's Gap; (178, 238).
- *Tussilago farfara L., Coltsfoot. Uncommon; scattered individuals growing along the banks of the Tye River; (19, 704).
- *Verbesina alternifolia (L.) Brown ex Kearney. Common; roadsides and woodland margins; (576).
- Vernonia glauca (L.) Willd. Common; old fields, roadsides and waste places throughout; (478).

BALSAMINACEAE

- *Impatiens capensis Meerb., Spotted Touch-me-not, Jewel-weed. Common; large colonies in mesic woods, coves, and along streams; (420, 484).
- *I. pallida Nuttall, Touch-me-not, Jewel-weed. Common; large colonies in mesic woods, coves, and along streams; (544).

BERBERIDACEAE

Caulophyllum thalictroides (L.) Michaux, Blue Cohosh, Papoose-root. Occasional; cove forests, mesic slopes, and streambanks; (64, 891).

Podophyllum peltatum L., May-apple. Locally abundant; low areas along streams, roadsides and in old fields; (81).

BETULACEAE

*Alnus serrulata (Aiton) Willd., Tag Alder. Locally abundant; along streams in open places at lower elevations; (623, 707).

Betula lenta L., Cherry Birch. Common; mesic, deciduous wooded slopes, primarily north-facing; (975).

*B. lutea Michaux f., Yellow Birch. Occasional; mesic, deciduous wooded slopes, primarily at the higher elevations; (888, 993).

Carpinus caroliniana Walter, Ironwood. Uncommon; wooded streambanks at lower elevations; (709).

Ostrya virginiana (Miller) K. Koch, Hop Hornbeam. Common; wet woodland margins and streambanks; (779, 869).

BORAGINACEAE

*Cynoglossum virginianum L., Wild Comfrey. Occasional; wooded streambanks; (220).

Echium vulgare L., Viper's Bugloss, Blue-weed. Uncommon; old fields and waste places, at lower elevations; (163).

*Hackelia virginiana (L.) I. M. Johnston, Beggar's Lice, Burseed, Stickweed. Common; old fields, homesites and waste places; (767).

*Myosotis laxa Lehman. Locally common; open streambanks in disturbed areas; (954).

BRASSICACEAE

*Alliaria petiolata (Bieb.) Cavara & Grande, Garlic Mustard. Rare; a few individuals growing along an old field margin just south of Reed's Gap; (95).

*Arabis hirsuta (L.) Scop. Occasional; weedy areas and waste places; (60).

- A. laevigata (Muhl. ex Willd.) Poiret var. laevigata. Occasional; mesic, thinly wooded areas; (48, 757).
- *Barbarea verna (Miller) Ascherson. Occasional; low fields and roadsides; (1059).
- B. vulgaris R. Brown. Common; low fields; roadsides and waste places; (55).
- *Cardamine concatenata (Michaux) Ahles. Abundant; rocky, wooded slopes; (17, 51).
- *C. hirsuta L. Abundant; fields, roadsides and waste places throughout; (9, 952).
- *C. pennsylvanica Muhl. Common; growing in shallow, slow-moving streams in open locations; (45, 696).
- Draba ramosissima Desvaux. Uncommon; rocky, deciduous wooded slopes; (154).
- Hesperis matronalis L., Dame's Rocket. Rare; a few individuals along Rt. 680 just south of the Lesesne State Forest; (84).
- *Lepidium campestre (L.) R. Brown, Cow Cress. Common; old fields and orchards; (75).
- *L. virginicum L., Poor-man's Pepper. Common; old fields, orchards, roadsides and waste places throughout; (206).
- *Rorippa islandica (Oeder) Borbas. Rare; a few individuals along a disturbed, open streambank just east of Love, Va.; (999).
- *Thlaspi perfoliatum L. Occasional; old fields, homesites and roadsides; (7).

BUXACEAE

- *Buxus sempervirens L., Common Boxwood. Locally common; persisting from cultivation around old homesites; (253).

CAMPANULACEAE

- Campanula americana L. Occasional; mesic deciduous woods and woodland margins; (469, 856).
- *C. divaricata Michaux. Common; rocky, mesic deciduous wooded slopes; (500, 612).
- *Lobelia cardinalis L., Cardinal Flower. Occasional; open streambanks and wet roadsides; (590).

*L. inflata L., Indian Tobacco. Common; old fields, roadsides and waste places; (582, 827).

L. siphilitica L., Great Lobelia. Common; streambanks and wet woodland margins; (698, 992).

*Specularia perfoliata (L.) A. DC., Venus' Looking-glass. Occasional; old fields, roadsides and waste places; (265).

CAPRIFOLIACEAE

*Lonicera japonica Thunberg, Japanese Honeysuckle. Abundant; roadsides, homesites and woodland margins throughout; (175).

Sambucus canadensis L., Elderberry. Common; mesic woodland margins throughout; (784).

S. pubens Michaux. Occasional; mesic deciduous woods at higher elevations; (99).

*Symphoricarpos orbiculatus Moench., Coral-berry, Indian Currant. Locally abundant; successional woodlands; (653, 797).

Triosteum perfoliatum L. Uncommon; roadsides and waste places; (224).

Viburnum acerifolium L. Abundant; deciduous wooded areas throughout; (122).

V. prunifolium L., Black Haw, Nanny-berry. Common; mesic to wet wooded areas throughout; (994, 1073).

CARYOPHYLLACEAE

*Cerastium glomeratum Thuillier. Common; open areas and waste places; (78).

*C. holosteoides var. vulgare (Hartman) Hylander. Occasional; old fields and roadsides; (118, 647).

*C. semidecandrum L. Uncommon; old fields and orchards; (172).

*Dianthus armeria L. Occasional; roadsides and waste places; (194, 284).

*Holosteum umbellatum L., Jagged Chickweed. Occasional; old fields and roadsides; (5).

*Lychnis alba Miller, White Champion. Roadsides and waste places; (141a, 858).

*Paronychia argyrocoma (Michaux) Nuttall, Silverling. Locally common; growing in cracks in exposed rocks; (554, 977).

- P. canadensis (L.) Wood. Uncommon; open woods and woodland margins; (742).
- P. fastigiata (Raf.) Fernald. Common; old fields and open deciduous woods; (782, 955).
- *Saponaria officinalis L., Soapwort, Bouncing Bet. Locally abundant; roadsides and waste places; (366, 1010).
- *Silene cucubalus Wibel, Bladder Campion. Common; old fields; roadsides and waste places; (210).
- *S. stellata (L.) Aiton f., Starry Campion. Occasional; mesic wooded slopes; (561).
- S. virginica L., Fire Pink. Occasional; roadsides and waste places; (69).
- *Stellaria media (L.) Cyrillo. Common; open areas throughout; (47).
- S. pubera Michaux, Giant Chickweed. Common; deciduous wooded areas throughout; (16, 32).

CELASTRACEAE

- *Celastrus scandens L. Rare; one individual growing along the dirt road in the Lesesne State Forest; (756).

CHENOPODIACEAE

- *Chenopodium album L., Lamb's-quarters. Common; disturbed areas throughout; (769).
- *C. standleyanum Aellen. Rare; one colony just northwest of the south entrance, Lesesne State Forest; (720).

CONVOLVULACEAE

- Calystegia sepium (L.) R. Brown, Hedge Bindweed. Occasional; old homesites and waste places; (934).
- **C. sericata (House) Bell. Rare; a few individuals in an old field at the northern end of the Lesesne State Forest; (264).
- *Cuscuta campestris Yuncker, Field Dodder. Occasional; growing on other plants in waste places; (481).
- *C. gronovii Willd. ex R. & S. Occasional; growing on other plants in waste places; (887).

CORNACEAE

Cornus alternifolia L.f. Occasional; scattered throughout deciduous wooded areas; (142, 878).

C. florida L., Flowering Dogwood. Abundant; wooded areas and woodland margins throughout; (33).

CRASSULACEAE

*Sedum neyii Gray. Locally common; growing on rocks and thin soil in dry, open woods; (177, 389).

S. telephioides Michaux, Live-for-ever. Locally common; cracks in exposed rocks in open woods; (813).

EBENACEAE

*Diospyros virginiana L., Persimmon. Uncommon; old homesites along Harper's Creek, possibly persisting from cultivation; (764).

ERICACEAE

Chimaphila maculata (L.) Pursh, Spotted Wintergreen. Abundant: wooded areas throughout; (359).

Gaylussacia baccata (Wang) K. Koch, Black Huckleberry. Common; deciduous woods, usually in xeric habitats; (96).

Kalmia latifolia L., Mountain Laurel or Ivy. Abundant; open, dry, wooded areas throughout; (188).

Menziesia pilosa (Michaux) Jussieu, Minnie-bush. Common; throughout open wooded areas; (149, 192).

Monotropa hypopithys L., Pine-sap. Common; open deciduous woods, scattered throughout; (261, 449).

M. uniflora L., Indian Pipe. Occasional; scattered throughout open deciduous wooded areas; (230, 1043).

Pyrola rotundifolia var. americana (Sweet) Fernald, Shinleaf. Uncommon; scattered in open wooded areas; (422).

Rhododendron catawbiense Michaux, Mountain Rosebay, Purple Laurel. Abundant; thinly wooded slopes and ridges throughout; (133).

*R. nudiflorum (L.) Torrey, Wild Azalea, Pinxter-flower. Common; open wooded areas; (83, 96).

*Vaccinium stamineum L., Squaw-huckleberry. Abundant; open and rocky woodlands, usually xeric; (97, 190).

*V. vacillans Torrey. Abundant; open and rocky woods, usually xeric; (63).

EUPHORBIACEAE

Acalypha rhomboidea Raf. Occasional; wooded roadsides and old field margins; (745).

*Euphorbia corollata L., Flowering Spurge, Tramp's Spurge.
var. corollata. Common; roadsides and waste places throughout; (216, 790).
var. zinniiflora (Small) Ahles. Occasional; waste places; (222).

*E. maculata L. Common; roadsides and waste places; (597, 661).

FABACEAE

*Albizia julibrissin Durazzini, Mimosa. Locally common; roadsides and woodland margins at lower elevations; (364).

Astragalus canadensis L. Uncommon; roadsides in wet areas and stream-banks; (387, 774).

*Cassia fasciculata Michaux, Partridge Pea. Occasional; roadsides and old field margins; (700).

C. marilandica L., Wild Senna. Uncommon; old field margins at lower elevations; (751).

C. nictitans L., Wild Sensitive Plant. Occasional; dry roadsides at lower elevations; (595).

Cercis canadensis L., Redbud. Common; roadsides, successional woods and forest margins; (36).

Desmodium nudiflorum (L.) DC. Common; wooded areas and woodland margins; (499, 684).

*D. viridiflorum (L.) DC. Occasional; wooded roadsides and open, mesic woods; (649).

*Galactia volubilis (L.) Britton. Occasional; old fields and woodland margins; (659).

*Gleditsia triacanthos L., Honey Locust. Uncommon; roadsides, successional woodlands and streambanks at lower elevations; (1022).

- Lathyrus venosus Muhl. ex Willd. Uncommon; wooded roadsides and open woods, usually in mesic habitats; (180).
- *Lespedeza bicolor Turcz. Uncommon; roadsides and open wooded areas; (752, 980).
- *L. cuneata (Dumont) G. Don. Occasional; old fields and roadsides; (713, 1006).
- *L. stipulacea Maxim., Korean Clover. Occasional; dry roadsides along Rt. 680 in the Lesesne State Forest; (723).
- *L. striata (Thunberg) H. & A., Japanese Clover. Occasional; roadsides and waste places; (722).
- *Melilotus alba Desr., White Sweet Clover. Common; low roadside ditches along Rt. 680; (275, 527).
- Robinia pseudo-acacia L., Black Locust. Common; disturbed areas, old fields and woodland margins throughout; (1005).
- *Trifolium campestre Schreber, Low Hop Clover. Common; old fields, orchards and homesites; (134, 414).
- *T. pratense L., Red Clover. Common; old fields, homesites and roadsides throughout; (177, 413).
- *T. repens L., White Clover. Abundant; open areas throughout the study area; (168).
- *Vicia angustifolia Reichard. Common; waste places and old homesites; (127, 258).
- *V. dasycarpa Tenore, Smooth Vetch. Locally common; roadsides and waste places; (255).
- *V. villosa Roth, Hairy Vetch. Occasional; old homesites and waste places; (257, 518).

FAGACEAE

- Castanea dentata (Marshall) Borkh., American Chestnut. Abundant; stump sprouts present throughout; (1031).
- *Fagus grandifolia Ehrhart, Beech. Occasional; streambanks and slopes above streams, primarily at lower elevations; (708).
- Quercus alba L., White Oak. Common; rocky woods and slopes throughout; (1040).
- Q. coccinea Muenchh., Scarlet Oak. Occasional; rocky, thinly wooded slopes throughout; (1033).

Q. prinus L., Rock Chestnut Oak. Abundant; wooded areas throughout; (1039).

*Q. rubra L., Red Oak. Abundant; wooded areas throughout; (1027).

Q. velutina Lam., Black Oak. Locally common; dry, rocky wooded slopes; (1050).

FUMARIACEAE

Corydalis flavula (Raf.) DC. Uncommon; moist, wooded roadsides; (4).

C. sempervirens (L.) Persoon. Uncommon; thinly wooded areas surrounding cliffs; (667).

Dicentra cucullaria (L.) Bernh. Occasional; moist coves and shaded streambanks; (67, 1061).

D. eximia (Ker.) Torrey, Bleeding Heart. Uncommon; mesic and/or xeric slopes surrounding cliffs and outcrops; (147, 879).

GENTIANACEAE

Gentiana clausa Raf. Rare; one small colony growing in an unused access road to an old homesite off Rt. 664, ca. 2000 ft.; (862).

Obolaria virginica L., Pennywort. Uncommon; along the side of the A.T. in mesic woods just above the Tye River; (229).

GERANIACEAE

*Erodium cicutarium (L.) L'Her., Heronsbill. Uncommon; old fields, orchards and waste places; (998).

*Geranium carolinianum L. Common; old fields, orchards and homesites; (136).

*G. columbinum L. Occasional; old fields and orchards; (353, 660).

G. maculatum L., Wild Geranium. Abundant; wooded areas throughout; (58, 525).

*G. molle L., Dovesfoot Cranesbill. Occasional; old fields and orchards; (77, 170).

HAMAMELIDACEAE

Hamamelis virginiana L., Witch-hazel. Abundant; rocky woods throughout the area; (150, 814).

HYDROPHYLLACEAE

*Hydrophyllum virginianum L. Uncommon; wooded streambanks; (226).

Phacelia dubia (L.) Trelease. Common; old fields, orchards and homesites; (72, 1071).

HYPERICACEAE

*Hypericum gentianoides (L.) BSP., Pineweed. Locally common; thin soils at outcrop margins; (831).

*H. mutilum L. Common; weedy disturbed areas, usually near water; (436, 989).

*H. perforatum L. Occasional; old fields and roadsides; (455).

H. punctatum Lam. Common; old fields, roadsides and waste places; (370, 466).

JUGLANDACEAE

Carya cordiformis (Wang.) K. Koch, Bitternut Hickory. Common; mesic oak-hickory woods and coves; (1061).

C. glabra (Miller) Sweet, Pignut Hickory. Common; deciduous woods at lower elevations; (1017).

*C. tomentosa (Poiret) Nuttall, Mockernut Hickory. Common; dry deciduous woods at lower elevations; (1026, 1036).

Juglans cinerea L., Butternut, White Walnut. Rare; one individual noted along Rt. 680 just south of the Lesesne State Forest; (1002).

*J. nigra L., Black Walnut. Locally common; woodland margins and old homesites; (638).

LAMIACEAE

*Agastache nepetoides (L.) Kuntze. Uncommon; old field margins and open deciduous woods; (734).

A. scrophulariaefolia (Willd.) Kuntze. Uncommon; mesic deciduous woods; (815).

Collinsonia canadensis L. Occasional; successional woods and wooded roadsides; (721).

- *Cunila origanoides (L.) Britton. Occasional; rocky deciduous woods; (668, 671).
- *Glecoma hederacea L. Common; old fields, homesites and waste places; (11, 80).
- Hedeoma pulegioides (L.) Persoon, Pennyroyal. Occasional; woodland margins and waste places; (774, 997).
- Lamium amplexicaule L. Common; old fields, orchards, homesites and waste places throughout; (8).
- *Leonurus cardiaca L., Motherwort. Occasional; disturbed woods and old homesites; (250, 287).
- *Lycopus virginicus L. Common; wet wooded areas and streambanks; (689, 998).
- *Monarda clinopodia L. Common; mesic deciduous woods; (386).
- *M. fistulosa L. Common; disturbed areas and wooded roadsides at lower elevations; (592).
- Nepeta cataria L. Occasional; old fields and successional woodlands; (654).
- Perilla frutescens (L.) Britton. Uncommon; thinly wooded areas; (712).
- Prunella vulgaris L. Common; roadsides and woodland margins; (282, 645).
- *Pycnanthemum incanum (L.) Michaux. Occasional; old fields and orchards; (402).
- *Satureja vulgaris (L.) Fritsch. Occasional; roadsides and old fields; (375.)
- *Scutellaria lateriflora L. Occasional; boggy area at head of unnamed western boundary stream; (711).
- *S. ovata Hill. Uncommon; old fields and homesites; (780).
- *Stachys latidens Small. Occasional; thinly wooded streambanks; (294).
- Trichostema dichotomum L. Common; old fields and waste places; (637, 765).

LAURACEAE

- Lindera benzoin (L.) Blume, Spicebush. Common; shaded streambanks and seepage areas throughout; (14, 732).

*Sassafras albidum (Nuttall) Nees., Sassafras. Common; woodland margins throughout; (35).

LYTHRACEAE

*Cuphea viscosissima Jacquin. Rare; wet, open seepage areas; (853).

MAGNOLIACEAE

Liriodendron tulipifera L., Tulip Tree. Common; successional and second growth woods throughout; (182, 729).

Magnolia acuminata L., Cucumber Tree. Occasional; old homesites and streambanks; (296, 760).

MALVACEAE

*Malva neglecta Wallroth, Common Mallow, Cheeses. Occasional; old homesites and waste places; (1000).

*Sida spinosa L., Prickly Mallow. Occasional; old homesites and waste places; (768).

MENISPERMACEAE

Menispermum canadense L., Moonseed. Uncommon; disturbed woodland margins along the Tye River; (907).

MORACEAE

*Broussonetia papyrifera (L.) Vent., Paper Mulberry. Occasional; old homesites along Harper's Creek; (761).

*Morus rubra L., Red Mulberry. Occasional; old homesites along Harper's Creek; (702, 763).

NYSSACEAE

Nyssa sylvatica Marshall, Black Gum. Common; deciduous wooded slopes and coves at lower elevations; (717, 1008).

OLEACEAE

*Chionanthus virginicus L., Fringe-Tree. Occasional; dry mixed woods surrounding rock outcrops; (906).

Fraxinus americana L., American or White Ash. Occasional; mixed deciduous woods at lower elevations; (1021).

*Ligustrum vulgare L. Uncommon; persisting from cultivation around old homesites; (775).

ONAGRACEAE

*Circaea lutetiana spp. canadensis (L.) Ascherson & Magnus. Common; old fields and open woodlands; (309, 647).

*Epilobium coloratum Biehler. Occasional; wet wooded areas and stream-banks; (757, 856b).

*Gaura biennis L. Occasional; old fields and orchards; (634).

*Ludwigia palustris (L.) Ell. Uncommon; thinly wooded wet areas; (754).

*Oenothera biennis L., Evening Primrose. Abundant; old fields, homesites and waste places throughout; (400, 881).

*O. parviflora L., Evening Primrose. Uncommon; old fields in the Lesesne State Forest; (949).

*O. tetragona Roth, Sundrops. Occasional; dry, rocky woods at higher elevations; (320).

OROBANCHACEAE

Conopholis americana (L.) Wallroth, Squaw-root, Cancer-root. Locally common; dry wooded slopes, primarily in oak woods; (156, 160).

Epifagus virginiana (L.) Barton, Beech-drops. Uncommon; beech woods along streams and on slopes above streams; (925).

Orobanche uniflora L. Uncommon; mesic, deciduous wooded slopes; (114, 184a).

OXALIDACEAE

*Oxalis florida Salisbury. Occasional; deciduous wooded slopes; (390).

*O. dillenii Jacquin. Common; old fields and orchards throughout; (167, 482).

*O. stricta L. Abundant; old fields, open wooded areas and waste places throughout; (235, 995).

PAPAVERACEAE

Chelidonium majus L. Rare; a few individuals growing near the confluence of the Tye River and Campbell's Creek; (460).

*Papaver dubium L., Poppy. Rare; one small colony along Rt. 680 just inside the south boundary of the Lesesne State Forest; (162).

Sanguinaria canadensis L., Bloodroot. Abundant; wooded areas throughout; (15).

PASSIFLORACEAE

*Passiflora lutea L., Passion-flower. Occasional; low deciduous woods; (719).

PHRYMACEAE

Phryma leptostachya L., Lop-seed. Common; thickets and open woods, often found in association with beech; (358, 725).

PHYTOLACCACEAE

Phytolacca americana L., Poke, Pigeonberry. Locally abundant; old fields, woodland margins, open streambanks and waste places throughout; (374).

PLANTAGINACEAE

Plantago aristata Michaux. Common; old fields and orchards throughout; (605).

*P. lanceolata L., English Plantain. Locally abundant; old fields, orchards and waste places throughout; (580, 986).

*P. rugelii Dcne. Common; old fields and orchards; (503, 599).

*P. virginica L. Common; orchards and old fields; (73).

PLATANACEAE

Platanus occidentalis L., Sycamore. Common; streambanks throughout the lower elevations; (462).

POLEMONIACEAE

*Phlox paniculata L., Summer Phlox. Rare; a few individuals noted at an old homesite along Harper's Creek, ca. 1700 ft.; (772).

POLYGONACEAE

*Polygonum aviculare L. Occasional; old fields and roadsides; (640).

*P. persicaria L. Locally abundant; disturbed areas, primarily roadsides, throughout; (463).

*P. punctatum Ell. Occasional; open mesic woods; (973).

P. sagittatum L. Common; open, wet roadsides along Rt. 680; (437, 750).

P. scandens L. var. scandens. Common; old fields and orchards; (641, 705).

*Rumex acetosella L., Sheep-sorrel. Abundant; roadsides, old fields and waste places throughout; (76).

*R. crispus L. Common; woodland margins; (409).

*R. obtusifolius L. Occasional; old fields and orchards; (208).

PORTULACACEAE

*Portulaca oleracea L. Occasional; open woods and low fields; (898).

*Talinum teretifolium Pursh. Uncommon; growing on a rock outcrop adjacent to the A.T. above the Tye River; (912).

PRIMULACEAE

Lysimachia quadrifolia L., Whorled Loosestrife. Common; scattered throughout wooded areas; (228).

RANUNCULACEAE

Aconitum uncinatum L., Monkshood. Uncommon; streambanks and mesic slopes; (304).

Anemone lancifolia Pursh. Uncommon; individuals scattered throughout wooded portions of the area; (90).

A. virginiana L., Thimbleweed. Common; woodland margins and open wooded areas; (266, 333).

- *Aquilegia canadensis L. Occasional; wooded roadsides and woodland margins; (200).
- Caltha palustris L., Marsh-Marigold. Locally common; low, wet woods and thickets; (110).
- Cimicifuga racemosa Nuttall, Black Cohosh. Streambanks and wet woodland margins; (363, 450).
- Clematis virginiana L., Virgin's Bower. Common; old fields and roadsides; (656, 793).
- Hepatica americana (DC.) Ker. Occasional; rocky wooded slopes, commonly above streams; (1077).
- Thalictrum dioicum L. Occasional; mesic deciduous woods; (103).
- *T. revolutum DC. Occasional; wooded roadsides and open wooded areas; (243).
- *T. thalictroides (L.) Boivin, Windflower. Common; wooded roadsides and woodlands throughout; (128, 1053).
- Trautvetteria carolinensis (Walter) Vail. Occasional; shaded streambanks and wet, wooded areas; (245, 305).

RHAMNACEAE

- *Ceanothus americanus L., New Jersey Tea. Uncommon; open deciduous woods and streambanks; (269, 522).

ROSACEAE

- *Agrimonia gryposepala Wallroth, Agrimony, Cocklebur, Harvest-lice. Occasional; old fields and openings in wooded areas; (510).
- Amelanchier arborea (Michaux f.) Fernald. Common; mixed deciduous woods and woodland margins throughout; (144, 523).
- *A. spicata (Lam.) K. Koch. Uncommon; growing around rock outcrops above the Tye River; (54).
- *Aruncus dioicus (Walter) Fernald, Goat's-beard. Uncommon; mesic woods and woodland margins; (239).
- *Crataegus flabellata (Bosc.) K. Koch, Hawthorn. Common; dry rocky woods and rock ledges; (104, 678).
- *Duchesnea indica (Andrz.) Focke, Indian Strawberry. Common; old fields, orchards, roadsides and old field margins; (3).

- *Fragaria virginiana Duchesne, Strawberry. Abundant; old fields, orchards, homesites and waste places throughout; (39, 70).
- *Geum canadense Jacquin, Aven. Common; roadsides and mesic deciduous woods; (357, 453).
- *Malus coronaria (L.) Miller, Crab-apple. Occasional; woodland margins and successional woodlands; (1069).
- *M. pumila Miller, Common Apple. Locally abundant; abandoned orchards and as a roadside escape from cultivation; (37).
- Potentilla canadensis L., Five-fingers. Common; old fields, roadsides and waste places throughout; (49).
- *P. norvegica L. Common; old homesites, fields, streambanks and orchards; (270, 850).
- *P. recta L. Occasional; dry sandy roadsides, streambanks and old fields; (276).
- *Prunus americana Marshall, Wild Plum. Uncommon; a few individuals noted along Rt. 680 south of the Lesesne State Forest; (630).
- *P. angustifolia Marshall, Chickasaw Plum. Uncommon; scattered in mesic deciduous woods; (325).
- P. pensylvanica L.f., Fire Cherry, Pin Cherry. Uncommon; successional woods; (778).
- *P. persica (L.) Batsch, Peach. Uncommon; persisting from cultivation in successional orchards; (34).
- P. serotina Ehrhart, Black Cherry. Common; moist deciduous woods and woodland margins throughout; (345, 840).
- *P. virginiana L., Choke Cherry. Occasional; deciduous woods at higher elevations; (102).
- *Rosa carolina L., Wild Rose. Occasional; roadsides, old fields and homesites; (213).
- *R. multiflora Thunberg. Occasional; disturbed roadsides; (139).
- *R. wichuraiana Crepin, Memorial Rose. Occasional; persisting near old homesites; (225).
- Rubus allegheniensis Porter, Blackberry. Locally common; around outcrops, ledges and along woodland margins at higher elevations; (121, 534).
- *R. argutus Link, Blackberry. Locally abundant; old homesites, roadsides, fields and woodland margins throughout; (485).

- *R. flagellaris Willd., Dewberry. Common; old fields, homesites and roadsides throughout; (657).
- R. odoratus L., Flowering Raspberry. Occasional; mesic woods and streambanks; (286, 393).
- Sorbus americana Marshall, Mountain Ash. Rare; scattered individuals at the highest elevations; (1018).
- S. melanocarpa (Michaux) Schneider, Black Chokeberry. Uncommon; streambanks; (132).
- *Spiraea alba DuRoi, Meadow-sweet. Occasional; mesic woods and streambanks; (341).
- *S. betulifolia Pallas. Occasional; scattered in rocky deciduous woods; (335).
- *S. prunifolia Sieb. & Zucc. Uncommon; growing along fence-rows in the Lesesne State Forest; (38).

RUBIACEAE

- *Diodia teres Walter. Common; old fields, roadsides and waste places; (581).
- *D. virginiana L. Uncommon; old homesites and low fields; (1028).
- *Galium aparine L. Common; old fields, roadsides and woodland margins; (124).
- G. latifolium Michaux. Locally abundant; deciduous woods and woodland margins; (189, 562).
- Houstonia caerulea L., Bluets. Common; deciduous wooded areas throughout; (1066).
- H. longifolia Gaertner. Common; open deciduous woods and woodland margins; (161, 273).
- *H. tenuifolia Nuttall. Uncommon; mesic deciduous woods and wooded roadsides; (613).
- Mitchella repens L., Partridge Berry. Occasional; wooded slopes and streambanks, often associated with hemlocks; (20, 280).

SALICACEAE

- Salix sericea Marshall, Silky Willow. Locally abundant; open streambanks, primarily along Rt. 680; (860).

SAXIFRAGACEAE

Chrysosplenium americanum Schweinitz, Golden Saxifrage. Locally common; seepage areas and shallow, slow-moving streams; (13, 28).

Heuchera americana L., Alumroot. Uncommon; mesic deciduous woods; (287).

Hydrangea arborescens L. ssp. arborescens, Hydrangea. Common; deciduous woods and woodland margins throughout; (611).

*Philadelphus coronarius L., Mock-orange. Uncommon; old homesites; (120).

Ribes rotundifolium Michaux, Gooseberry. Common; open deciduous woods at higher elevations; (323, 1072).

Saxifraga micranthidifolia (Haw.) Steudel, Saxifrage. Occasional; growing on moist rocks in seepage areas and along streams; (298).

S. virginensis Michaux, Saxifrage. Occasional; exposed rocks in wooded areas; (56, 1058).

SCROPHULARIACEAE

Aureolaria laevigata (Raf.) Raf. Abundant; wooded areas with a large number of Quercus spp. throughout; (530, 672).

*A. pectinata (Nuttall) Pennell. Uncommon; xeric pine woods, possibly in previously burned areas; (876).

Chelone glabra L., Turtleheads. Occasional; seepage areas and streambanks; (841).

*Linaria vulgaris Hill, Butter-and-eggs. Occasional; roadsides and waste places; (164, 786).

*Lindernia dubia (L.) Pennell. Uncommon; wet woodland margins; (894).

*Mimulus ringens L. Common; wet fields and streambanks; (519, 591).

*Paulownia tomentosa (Thunberg) Steudel, Princess Tree. Occasional; roadsides and waste places, usually at lower elevations; (82).

Pedicularis canadensis L., Lousewort. Abundant; open mixed deciduous woods throughout; (59).

Penstemon canescens Britton. Occasional; roadsides and woodland margins; (165, 418).

*Scrophularia marilandica L., Figwort. Occasional; streambanks and woodland margins; (227, 285).

*Verbascum thapsus L., Woolly Mullein. Locally abundant; roadsides, old fields and waste places throughout; (1001).

*Veronica americana (Raf.) Schweinitz ex Bentham. Rare; along an open streambank in an old orchard along Harper's Creek; (759).

*V. arvensis L. Common; old fields and orchards throughout; (79).

V. officinalis L. Common; old fields and orchards throughout; (166).

*V. peregrina L. Occasional; roadsides and old fields; (896).

SIMAROUBACEAE

*Ailanthus altissima (Miller) Swingle, Tree of Heaven. Occasional; roadsides and waste places at lower elevations; (770).

SOLANACEAE

Datura stramonium L., Jimson Weed. Locally common; old fields, orchards and waste places; (639).

*Physalis virginiana Miller var. virginiana. Occasional; wooded roadsides; (788).

*Solanum americanum Miller. Occasional; old fields, roadsides and woodland margins; (675).

*S. carolinense L. Common; disturbed areas, old fields and waste places throughout; (202).

STAPHYLEACEAE

*Staphylea trifolia L., Bladdernut. Uncommon; occasional individuals growing in successional forested areas along the Tye River; (904).

TILIACEAE

Tilia heterophylla Vent. Common; mesic deciduous woods and streambanks throughout; (870, 1003).

ULMACEAE

*Celtis occidentalis L.
var. occidentalis. Occasional; rocky, wooded slopes; (911).
var. georgiana (Small) Ahles. Occasional; woodland margins; (1024).

Ulmus rubra Muhl., Slippery Elm. Occasional; streambanks and mesic woods at lower elevations; (773).

URTICACEAE

*Boehmeria cylindrica (L.) Swartz, False Nettle. Common to locally abundant; woodland margins and old fields; (584, 622).

*Laportea canadensis (L.) Weddell, Wood-nettle. Locally abundant; streambanks and mesic coves; (508, 968).

*Parietaria pennsylvanica Muhl. ex Willd. Uncommon; open, wooded areas; (718).

*Pilea pumila (L.) Gray, Clearweed. Common; streambanks and wet woodland margins; (690, 773).

VERBENACEAE

Verbena urticifolia L. Common; old fields, orchards and waste places; (621).

VIOLACEAE

Hybanthus concolor (Forster) Sprengel, Green Violet. Rare; a few individuals noted along the A.T. on a mesic south slope, ca. 3000 ft.; (159).

Viola canadensis L. Abundant; mesic woods and streambanks throughout; (137, 146).

V. eriocarpa Schweinitz. Common; essentially throughout; (66, 93).

*V. macloskeyi var. pallens (Banks ex DC.) C. L. Hitchcock. Uncommon; a few individuals noted along Harper's Creek just above the shelter on the A.T.; (151).

V. palmata L. Common; wooded areas, essentially throughout; (71, 94).

V. papilionacea Pursh. Abundant; essentially throughout; (31, 41).

*V. rafinesquii Greene. Abundant; essentially throughout; (6, 40).

V. rotundifolia Michaux. Occasional; mesic deciduous woods and streambanks; (292, 1063).

VITACEAE

*Parthenocissus quinquefolia (L.) Planchon, Virginia Creeper. Common; rocky wooded slopes throughout; (796, 910).

Vitis aestivalis Michaux var. argentifolia (Munson) Fernald, Silver-leaf Grape. Occasional; roadside thickets and streambanks; (629b).

*V. baileyana Munson, Possum Grape. Occasional; streambanks and low woods; (219).

*V. cinerea Engelm. ex Millardet, Pigeon Grape. Occasional; low woods and streambanks; (629a).

V. labrusca L., Fox Grape. Common; open streambanks and low woods; (183, 942).

V. vulpina L., Frost Grape. Occasional; streambanks and low woods; (198a).

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