length, length of the central leaflet, width of central leaflet, and the number of teeth on the central leaflet were higher in population D than in the remaining three populations. It seems suggestive of the fact that an increase in the pollution level contributed to a decrease in the overall vegetative growth of *Cannabis sativa* plant populations. Standard deviation values for these measurements further indicate the differences in growth in these two sets of populations to be significant.

Furthermore, analysis of trichome data suggests fairly significant results. Trichome density on the upper leaf surface was found to be the lowest (2,787/cm^2) in population D-the most sheltered and the least polluted population of *Cannabis sativa.* Populations A, B, and C representing polluted habitats exhibited much larger trichome density indicating a direct response to pollution stress. Trichome length of 153.7 μ was the shortest in population D while the remaining populations had higher values—again increased environmental pollution seemed to induce longer trichomes on the leaf surface of *Cannabis sativa.* Subsidiary cell complex consisting of 2-3 cells remained the same in all the four populations of this taxon.

The results derived from these data seen to suggest that *Cannabis sativa* does respond to environmental pollution stress generated by vehicular traffic along a busy higway in a mountainous site. Plant growth was adversely affected by environmental pollution as evidenced by a decrease in the size of leaf, petiole length, number of leaflets, length and width of central leaflets, and the number of teeth on central leaflets. Environmental pollution also induced longer and more numerous trichomes on leaves, which appeared to be defense mechanisms against excessive entry of particulate and gaseous matter, platforms to trap particulate matter, and insulators for leaf surfaces. While the trichome response seems obvious, the ramifications of higher trichome density in polluted habitat populations are interesting. Since trichomes are known to be the site of THC (tetrahydrocannabinol) production in *Cannabis sativa,* it would appear that environmental pollution may induce greater THC production in this taxon, although a biochemical analysis of the representative plant populations of *Cannabis sativa* is needed to understand this relationship. However, the present study does seem to suggest that THC production by *Cannabis sativa* is obviously a defensive mechanism against environmental hazards.

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PRELIMINARY STUDY OF DECIDUOUS FORESTS WITHIN THE INNER CENTRAL BASIN OF MIDDLE TENNESSEE

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ABSTRACT

Five deciduous forest stands within the Inner Central Basin of Middle Tennessee were studied using the point quarter method of analysis. Data are in the form of importance value indices and stand coefficients. A total of thirty-one species was encountered. These small stands, which occur sporadically among cedar glades and areas of human development, represent a mixture of forest types characteristic of the Interior Low Plateau.

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INTRODUCTION

The Central Basin of Middle Tennessee lies within the Western Mesophytic Forest region of the Interior Low Plateau (DeSelm *et al.* 1982). The Western Mesophytic Forest region is typified by a mosaic of forest types often similar in components to those of adjacent areas (Braun, 1950). The Basin has been divided both floristically (Shanks, 1958) and topographically (DeSelm, 1959) into inner and outer portions. The Inner Basin includes most of Rutherford and Wilson counties and portions of adjacent Bedford, Davidson, Marshall, and Maury counties. It is chiefly a flat to gently rolling area of mild karst topography.

The major plant communities common to much of the Inner Basin are cedar glades, cedar thickets, cedar- hardwood forests, and deciduous forests (Quarterman, 1950a, 1950b; Harper, 1926; Freeman, 1933; Shanks, 1958). Our concern here is with the deciduous forests. These forests occur intermittently throughout the Inner Central Basin. The objective is to conduct a preliminary investigation in order to obtain basic information regarding the woody composition of these forests.

Study Areas

Five upland stands were chosen based on the following criteria: (1.) size (minimum of 8 hectares), (2.) public lands (to ensure adequate protection for future studies, and (3.) accessibility. Three stands are adjacent to Percy Priest Lake and are designated as: *Stand One*—Hamilton Creek; *Stand Two*—Couchville Pike; and *Stand Three*—Poole Knobs. The other two stands are located within the Cedars of Lebanon State Forest and are designated as: *Stand Four*—Cedar Forest; and *Stand Five*—Simmons Bluff. No stand had any recent history of logging or any other apparent disturbance. However, selective cutting is known to have occurred throughout the area during the early 1900's; records also indicate the cutting of oak, hickory, and black walnut somewhat more recently.

Stands one through four have developed on the Carter limestone formation, a massive, gray to dove colored dolomitic limestone occurring directly above the Lebanon limestone formation (the characteristic platy, thin bedded limestone associated with the cedar glades). Stand five occurs on the Ridley formation, a massive, relatively pure limestone occurring directly below the Lebanon formation (Wilson, 1949). The soils associated with these stands are shallow, well drained, silt loams. Topographically, the areas involved display a two to ten percent slope and moderate rock outcropping.

Methods

Field studies were conducted during the summers of 1979 and 1980. The point quarter method of Cottam *et al.* (1953) was used. Fifty points were used in sampling the canopy/subcanopy layer (Dbh $\geq$ 10 cm.). The points were selected at random along parallel transects at sufficient distances to insure that successive points sampled different trees. Species area curves determined the number of sampling points per stand to be adequate. Relative density, relative dominance, and relative frequency were calculated to obtain the importance value indices (Table 1) which were then calculated to be directly comparable on a percentage scale ranging from 0 to 100 (Vankat *et al.*, 1975). Stand coefficients (Table 2) were derived from the frequency data to determine the degree of similarity between each stand (Oosting, 1956; Phillips, 1959). Nomenclature follows that of Gleason and Cronquist (1963).

Results and Discussion

Table 1 includes all taxa and their respective importance values. Thirty-one species representing 17 genera were recorded. These stands basically represent a maple/oak/hickory/ash type according to the criteria established by DeSelm and Schmalzer (1982). It is our contention that the relatively minor variations among the stands are due mainly to human influence. Edaphic and topographic features are quite similar. Although no earlier studies of forest composition dealing specifically with the Inner Central Basin were found, the composition of these stands was in accordance with references to the Central Basin in general (Killebrew and Safford, 1974; Quarterman, 1950b,

TABLE 1: *Tree species and importance value indices (calculated on a percentage scale of 0 to 100) for five forest stands within the Inner Central Basin of Middle Tennessee.*

TAXA	STANDS 1	2	3	4	5
Acer saccharum Marsh	19.1	11.3	3.6	37.9	3.5
Ailanthus altissima (Mill.) Swingle	5.6	—	—	—	—
Carya glabra (Mill.) Sweet	4.9	2.9	6.4	—	—
C. ovata (Mill.) K. Koch	16.1	11.1	13.8	14.4	15.1
C. tomentosa Nutt.	—	1.0	3.1	7.3	9.6
Celtis laevigata Wild	—	1.1	—	—	—
C. occidentalis L.	2.1	3.4	—	—	—
Cercis canadensis L.	2.8	1.2	5.5	—	—
Cornus florida L.	—	—	3.5	—	12.1
Diospyros virginiana L.	6.8	5.1	3.3	3.9	—
Fraxinus americana L.	10.5	10.9	12.7	8.8	—
F. pennsylvanica Marsh.	—	1.1	—	—	—
F. quadrangulata Michx.	6.1	—	4.6	—	—
Gleditsia triacanthos L.	—	1.1	—	—	—
Juglans nigra L.	3.5	4.5	—	—	—
Juniperus virginiana L.	3.5	4.8	8.1	1.4	8.0
Morus rubra L.	—	1.1	—	—	1.5
Ostrya virginiana (Mill.) K. Koch	1.9	8.8	—	—	—
Prunus serotina Ehrh.	—	—	—	—	5.5
Quercus alba L.	—	4.7	2.6	—	—
Q. borealis var. *maxima* (Marsh.) Ashe	4.1	7.2	3.9	7.5	13.5
Q. falcata Michx.	—	—	9.8	—	—
Q. macrocarpa Michx.	—	7.0	—	—	2.9
Q. prinoides Buckl.	5.8	1.2	—	1.2	4.9
Q. prinus L.	—	1.6	—	—	—
Q. shumardii Buckl.	—	—	—	2.5	—
Q. stellata Wang.	—	1.3	13.7	—	—
Q., velutina Lam.	—	—	2.4	13.4	21.2
Sassafras albidum (Nutti) Nees	—	—	—	—	2.1
Ulmus americana L.	4.5	7.6	3.0	1.7	—
U. rubra Muhl.	2.7	—	—	—	—

TABLE 2: *Similarity coefficients (based on relative frequency) for five forest stands within the Inner Basin of Middle Tennessee.*

STAND	COEFFICIENTS 1	2	3	4	5
1		71.2	55.9	57.8	30.5
2			59.4	55.5	36.1
3				57.7	43.6
4					65.5