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OLD FIELD SUCCESSION ON THE LOESSAL SOIL OF THE THIRD CHICKASAW BLUFF OF WEST TENNESSEE

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ABSTRACT

Old field succession was studied on three neighboring fields on loessal soil, differing in position on the Third Chickasaw Bluff of West Tennessee. Each community was sampled for floristic composition by quantitative vegetational analysis. It was found that the silt loam soils support a wide array of vegetation characteristic of mixed old fields. The three fields studied were located at the base of the slope, on the slope, and the crest of the bluff. Herbaceous dominants were *Sorghum halepense-Solidago altissima-Andropogon virginicus* in the 15 year old base field, *Sorghum halepense* in the 17 year old slope field, and *Erianthus giganteus-Andropogon virginicus* in the 18 year old crest field. The most common trees were *Acer negundo* in the base field, and *Liquidambar styraciflua* in the other two fields.

INTRODUCTION

Three neighboring old-field plant communities, differing in position on the Third Chickasaw Bluff and designated the base old-field, the slope old-field, and the crest old-field, were selected for study at the Edward J. Meeman Biological Station belonging to Memphis State University. The sampled area is in Shelby County, West Tennessee. It is adjacent to Meeman-Shelby Forest State Park. This portion of the bluff has the highest elevation in Shelby County, 129.6 meters above sea level, and overlooks a broad alluvial plain at 30-32 m elevation.

Characterized by rugged topography and dissected with numerous ravines, the Third Bluff is 20.9 km north of Memphis. Deposits of loess, 18 to 30 m in thickness, compose the bluff; the loess thins progressively eastward. Loess deposits on the bluff rest on alluvial Citronelle gravel and sands of Pleistocene origin (Murray, 1961). Leighton and Willman (1950) identified three different layers in the Pleistocene loess profiles of the Third Chickasaw Bluff: Loveland loess, the oldest and lowermost layer; Farmdale loess; and Peoria loess, the younger and uppermost layer. The bulk of upland soils that have developed on deep deposits of loess on the Third Bluff are classified as Memphis silt loams, with some Loring silt loam soils that develop on thinner loess.

THE BASE OLD-FIELD: The one-ha abandoned field at the base of the bluff has a southwest, northeast axis on a 3-4% northwest facing slope. Erosion has been slight. The field was last cultivated in corn 15 years prior to this study. The loessal soil is classified as Grenada silt loam and has a fragipan layer at about 0.7 meter. This field is the youngest, in terms of years since last cultivation, of the three fields sampled.

THE SLOPE OLD-FIELD: The 0.5-ha abandoned field on the slope of the bluff is part of a long, abandoned tract divided by moderate ridges. The 10% slope has a western exposure. Cotton was the last crop grown on the slope field 17 years prior to this study. The loessal soil is classified as Memphis silt loam and exhibits moderate erosion.

THE CREST OLD-FIELD: The long, narrow, 0.9-ha abandoned field on the crest of the bluff is on a 3% southwest-facing slope. The uppermost portion slopes 14% to the southeast and gradually levels in its lower third. The crest old-field was cultivated in cotton before abandonment 18 years ago. The loessal soil is classified as Memphis silt loam and exhibits moderate erosion.

METHODS

Quantitative vegetational analysis was determined by random list-count quadrat sampling procedure (Oosting, 1956). Plot sizes were 1 by 1 meter quadrats for herbaceous vegetation and 4 by 4 meter quadrats for communitites of shrubs and saplings. Herb quadrats were nested within each shrub quadrat in the southwest corner. A tree layer was not present (species attaining tree size of 10 cm DBH or greater). Saplings less than 10 cm DBH and over 35 cm tall were sampled in the shrub layer and seedlings under 35 cm tall were sampled in the herb layer.

Grid lines were laid out on each area, and the plot locations were selected randomly from a random numbers table (Snedecor, 1972). Sample plots were located in the field and constructed by sightings taken with a transit. Plot sampling was carried out from early spring to late fall. Diameters of the trees were measured with a diameter tape at 1.5 meter. Diameters of the smaller plants in the shrub and herb layers

were measured at the stem base with vernier calipers to the nearest 0.2 cm and converted to basal areas (Phillips, 1959).

Absolute density, frequency and dominance were determined for each species but expressed in a relative form: relative density, relative frequency and relative dominance. Relative values were then combined into a single Importance Value (maximum 300) for each species (Curtis and Cottam, 1962).

The adequacy of the number of plots sampled was determined with species area curves (Cain, 1938). This curve consists of the cumulative species total plotted against the number of samples taken. Adequacy of sampling was further evaluated by cruising the field after sampling was completed and noting the number and general abundance of species not encountered in the sample plots.

A coefficient of similarity was determined for the herb and shrub layers in each old-field in order to express the floristic and structural relationships between the communities. The coefficient of similarity was derived by the formula (Phillips, 1959):

$$C = \frac{2W}{A + B} \times 100$$

C = Coefficient of similarity
A = Number of species of one community
B = Number of species of the second community
W = Number of species common to both communities

RESULTS AND DISCUSSION

Base-Field Vegetation:

Thirty quadrats totaling 480 m² were used to sample the vegetation of the one-ha old-field community at the base of the bluff. Table 1 provides a list of the 96 species found in the shrub and herb layers with their importance value.

TABLE 1

Importance Values of Plants in the Three Fields.

	Base		Slope		Crest	
Species	Herb	Shrub	Herb	Shrub	Herb	Shrub
Acer negundo	4.49	80.85	3.09	18.81		
Acer rubrum		2.67			1.02	2.69
Acer saccharum						1.04
Agalinis fasciculata	3.97				4.00	
Ambrosia artemisifolia			1.09			
Ambrosia trifida			2.74		1.18	
Ampelopsis arborea	0.69					1.94
Ampelopsis cordata		0.47	1.06			
Amphicarpa bracteata					0.99	
Andropogon virginicus	30.73		8.74		55.38	
Anemone virginiana			2.55		0.93	
Anisostichus capreolata					1.24	1.21
Arisaema dracontium			4.61			
Arisaema triphyllum			0.89			
Asplenium platyneuron	3.95				5.83	
Aster pilosus	13.96		8.65		10.48	
Berchemia scandens	0.90	1.59			1.20	1.08
Blephilia hirsuta			1.97			
Bromus japonicus	12.67					
Campsis radicans	7.95	35.54	1.99	22.25	8.95	17.21
Carduus discolor	1.93					
Carex sp.					2.05	
Carpinus caroliniana						0.28
Carya cordiformis		0.51				
Carya illinoensis		0.90	0.89	28.05		5.81
Cassia fasciculata	11.67		7.45		17.01	
Celastrus scandens						0.88
Cercis canadensis		0.65		3.14	1.29	1.08
Clematis virginiaia	4.75	1.22	4.32	5.22		
Cocculus carolinus	0.33	1.11				
Commelina communis	0.54					
Cornus florida	0.33	2.74				
Cornus racemosa	1.97	20.92	3.09	29.49	1.29	26.90
Crataegus sp.						1.08
Cyperus ovularis					1.97	
Desmodium paniculatum	1.62	1.06	1.37			
Dioscorea villosa			0.89		1.66	
Diospyros virginiana		3.68	1.78	10.87	1.25	23.02
Duchesnea indica	1.33					
Elephantopus carolinianus	0.90				0.80	
Eragrostis spectabilis					6.21	
Erianthus giganteus	9.72		8.01		37.27	
Erigeron annuus	2.33		3.54		1.25	
Erigeron canadensis	8.69		4.40		1.91	
Eupatorium coelestinum	0.98		3.30			
Eupatorium serotinum	4.95		2.67			
Fagus grandifolia						2.05
Fragaria virginiana					0.83	
Fraxinus americana		0.47		14.99		3.35
Fraxinus pennsylvanica						1.09
Galium aparine	0.75					
Geranium carolinianum	1.25					
Geum canadense	2.71					
Gleditsia triacanthos						0.27
Gnaphalium obtusifolium	9.01				3.34	
Hydrangea arborescens	0.25	1.18				
Hypericum hypericoides	0.48					
Hypericum punctatum	4.47		5.60			
Ilex decidua						0.27
Ipomoea hederacea	0.74		1.30			
Ipomoea purpurea			1.74			
Juncus tenuis	5.72		1.72			
Juglans nigra		4.18			0.38	3.26
Juniperus virginiana						0.32
Lactuca floridana	0.62				0.41	
Lespedeza cuneata	7.75		1.06		2.04	

TABLE 1 (Continued)

Importance Values of Plants in the Three Fields.

Species	Base		Slope		Crest	
	Herb	Shrub	Herb	Shrub	Herb	Shrub
Liquidambar styraciflua	0.54	19.91	12.07	19.58	17.94	47.27
Liriodendron tulipiferea	0.62	6.38		1.72	2.60	13.23
Lonicera japonica	14.26		2.41		5.97	0.65
Matelea gonocarpa			1.06			
Morus rubra	1.41		1.09			
Nyssa sylvatica						0.72
Ostrya virginiana				1.66	0.83	5.72
Oxalis dillenii	0.90		3.34		2.41	
Panicum anceps					14.77	
Panicum lanuginosum					5.99	
Parthenocissus quinquefolia	3.96		3.58	9.98	3.88	1.82
Passiflora incarnata					0.41	
Phaseolus polystachios			4.24		3.86	
Physalis heterophylla	0.25					
Phytolacca americana	0.40					
Platanus occidentalis		19.73		3.37		
Podophyllum peltatum			1.78			
Polygonum scandens	1.59					
Populus deltoides		1.14				
Polystichum acrostichoides	0.90			0.83		
Prunus angustifolia		1.94		2.04	3.87	
Prunus serotina		1.78			1.36	
Pueraria lobata						0.79
Pyrrhopappus carolinianus	3.36		1.05			
Quercus muehlenbergii						1.41
Quercus nigra		0.51				0.77
Quercus velutina	0.33	7.60	0.89	8.11	1.76	12.89
Rhus glabra	0.54	16.32		17.51	0.38	32.13
Rhus radicans	19.52	6.32	14.64	56.65	10.92	29.88
Rubus argutus	8.25	14.24	9.03	18.26	5.90	6.96
Rubus trivialis	2.79		3.09		0.41	
Sabatia angularis			4.82			
Sambucus canadensis				2.81		
Sanicula canadensis	9.84		1.30		0.83	
Sassafras albidum	0.54	1.83		2.04	1.70	8.01
Smilax glauca			1.99	1.64	1.10	2.20
Smilax rotundifolia						0.83
Solidago altissima	26.23		16.33		18.49	
Sorghum halepense	35.03		104.99		6.58	
Strophostyles umbellata			3.34			
Trifolium campestre	0.98				0.41	
Ulmus alata	3.69	23.92	7.23	12.48		18.41
Ulmus rubra	2.48	17.47	1.99	6.59		5.48
Ulmus sp.						7.91
Valerinanella radiata	1.12					

TABLE 1 (Continued)

Importance Values of Plants in the Three Fields.

Species	Base		Slope		Crest	
	Herb	Shrub	Herb	Shrub	Herb	Shrub
Verbascum thapsus					0.54	
Verbesina alternifolia					0.53	
Vernonia altissima			6.12			
Viburnum prunifolium						0.32
Vicia angustifolia	0.61					
Viola rafinesquii	1.12				1.27	
Vitis cinerea			1.78			2.80
Vitis riparia	0.54	1.30				
Vitis rotundifolia	1.33		4.46	2.38	1.69	1.89
Woodsia obtusa	0.62					

Johnson grass *(Sorghum halepense)*, broomsedge *(Andropogon virginicus)*, and goldenrod *(Solidage altissima)*, were codominants of the 64 species recorded in the herb layer (Table 1). They were accompanied by poison ivy *(Rhus radicans)*, Japanese honeysuckle *(Lonicera japonica)*, aster *(Aster pilosus)*, brome grass *(Bromus japonicus)*, and partridge pea *(Cassia fasciculata)* with importance values greater than 10. Tree seedlings occupied a subordinate position. Those of box elder *(Acer negundo)* and elm *(Ulmus spp.)* had the highest frequency.

Box elder *(Acer negundo)* dominated the well-developed shrub layer which had 32 species present in the samples. It showed an importance value over twice that of the next most abundant species, trumpet vine *(Campsis radicans)*, and over three times the importance value of other common species, winged elm *(Ulmus alta)*, *Cornus racemosa*, sweetgum *(Liquidambar stryaciflua)*, sycamore *(Plantanus occidentalis)*, slippery elm *(Ulmus rubra)*, smooth sumac *(Rhus glabra)*, and blackberry *(Rubus argutus)*.

Slope-Field Vegetation:

Fifteen quadrats totaling 240 m² were used to sample the vegetation of the 0.5-ha old-field community on the slope of the loess bluff. Seventy-six species were present in the shrub and herb layers (Table 1).

Johnson grass *(Sorghum halepense)* was the major dominant in the herb layer; it had an importance value over 6 times that of the next two most common species, goldenrod *(Solidago altissima)* and poison ivy *(Rhus radicans)*. Sweetgum *(Liquidambar styraciflua)* was the most important tree seedling. Seedlings of winged elm *(Ulmus alta)*, box elder *(Acer negundo)* and *Cornus racemosa*, were of less importance.

Of the 24 species represented in the shrub layer eleven species had an importance value exceeding 10 and poison ivy *(Rhus radicans)* was the most important species. Other important members of the shrub layer were *Cornus racemosa*, pecan *(Carya illinoensis)*, trumpet vine *(Campsis radicans)*, blackberry *(Rubus argutus)*, smooth sumac *(Rhus glabra)*, white ash *(Fraxinus americana)*, winged elm *(Ulmus alata)*, and persimmon *(Diospyros virginiana)*. The most conspicuous feature of this field was the importance of *Sorghum halepense*.

Crest-Field Vegetation:

Thirty quadrats totaling 480 m² were used to sample the vegetation of the 0.9-ha old-field community on the crest of the loess bluff. Ninety-two species were identified in the shrub and herb layers (Table 1). This field had the aspect of a young open forest not yet developed enough to be differentiated into overstory and understory. There was a

greater diversity of woody species here than in the other fields investigated (Table 1).

Broomsedge *(Andropogon virginicus)* and plume grass *(Erianthus giganteus)* were the most important of the 57 species occurring in the herb layer. Other species with an importance value greater than 10 were goldenrod *(Solidago altissima)*, partridge pea *(Cassia fasciculata)*, panic grass *(Panicum anceps)*, poison ivy *(Rhus radicans)*, and aster *Aster pilosus)*. Sweetgum *(Liquidambar styraciflua)* was the most common tree seedling, having the highest frequency value of any species in the herb layer. It occurred in 75% of the quadrats.

The importance of *Andropogon virginicus* and *Erianthus giganteus* in the herb layer is noteworthy. The development of these species had increased to the point that they were the major dominant and aspect dominant, respectively. Their dominance was correlated with open sites where, together, they formed dense cover. *Erianthus giganteus* was recorded with more frequency in quadrats (73%), but the density of clumps per quadrat was lower than that of *Andropogon virginicus*.

Forty-five species were represented in the shrub layer dominated by sweetgum *(Liquidambar styraciflua)*, smooth sumac *(Rhus glabra)*. poison ivy *(Rhus radicans), Cornus racemosa,* persimmon *(Diospyros virginiana)*, trumpet vine *(Campsis radicans)*, winged elm *(Ulmus alata)*, tulip tree *(Liriodendron tulipfera)*, and black oak *(Quercus velutina)*.

Sweetgum, with a frequency value of 100%, also had the highest basal area value. Although all dominants were widely distributed, *Rhus glabra* and *Cornus racemosa* formed scattered thickets. *Prunus angustifolia* formed dense thickets but was restricted to a small area on the uppermost southeast slope.

Vines continued to be conspicuous components of the community. Thirteen woody vine taxa were represented in the quadrats. Five species common to all three fields were *Rhus radicans, Campsis radicans, Vitis rotundifolia, Parthenocissus quinquefolia*, and *Lonicera japonica. Ampelopsis arborea* and *Berchemia scandens* were also present in the field at the base of the bluff, while *Vitis cinerea* and *Smilax glauca* were recorded in the field on the slope of the bluff. *Smilax rotundifolia, Anisosthichus capreolata, Celastrus scandens*, and *Pueraria lobata* were also present.

The results of this successional study of abandoned fields in the loess bluff region of West Tennessee appear to be different from those reported for other parts of the Eastern Deciduous Forest Region. Secondary succession on the Third Chickasaw Bluff more nearly resembles that described by Quarterman (1957) for fields in the Central Basin of Tennessee in that the presence of many accessory species obscured clear-cut dominance in fields in all slope positions.

The importance of *Sorghum halepense* in the base and slope fields (Table 1) is a conspicuous feature. Johnson grass is sometimes an important species in early stages of old-field succession in the grassland, occurring in almost pure stands for a protracted period (Abdul-Wahab and Rice, 1967). Johnson grass appeared as a codominant with *Andropogon virginicus* and *Solidago altissima* in the base field, was more important in the slope field, and was least important in the crest field. Field observations indicated that Johnson grass, present at the time of abandonment, remained an important species after tillage stopped and assumed dominance the first year after abandonment. This is in accord with the findings of Abdul-Wahab and Rice (1967) for Oklahoma old-fields. However, the low importance of goldenrod and broomsedge in the slope field suggests a possible inhibitory influence by Johnson grass (Rice, 1983). In addition, the increased importance of seedlings of *Liquidambar styraciflua* in the older field would tend to substantiate its position as a major woody dominant of abandoned fields in this area.

The moderate importance value that *Aster pilosus* retained in all three fields resembles that reported by Quarterman (1957) for fields in middle Tennessee where *Aster* shares dominance in 3 year old fields with *Solidago altissima*, and in 4-8 year fields with *Andropogon virginicus*, but declines in importance in 12 to 20 year old fields. In the Piedmont of North Carolina, Keever (1950) indicated that *Aster* is dominant during the second year of abandonment, and *Andropogon* dominant from the third year or until replaced by pines. Similarly, in southern Illinois (Bazzaz, 1968), *Aster pilosus* reaches its peak in the second year, decreases sharply the third year, and is absent from fields more than 10 years old.

Broomsedge failed to develop complete cover in the fields studied in this investigation. This behavior is similar to that observed by Quarterman (1957) in middle Tennessee, but not to that found in North Carolina (Keever, 1950), Missouri (Drew, 1942), and southern Illinois (Bazzaz, 1968) where broomsedge develops into almost pure stands.

In southern Illinois Bazzaz (1968) reported a clear cut change in dominance of *Andropogon* and *Solidago* due to the change in the microenvironment created by developing tree cover. *Andropogon* reaches a peak in 4-10 year old fields, but continues as the major dominant through 40 year old fields.

The individuals in the study fields may be favorably compared to Middle and East Tennessee fields (Quarterman, 1957; Smith, 1968). The dominants *Liquidambar styraciflua* and *Acer negundo* on loessal soil on the Third Chickasaw Bluff in west Tennessee may be contrasted with species of *Ulmus* and *Celtis* in middle Tennessee (Quarterman, 1957), pines in the southern Piedmont (Billings, 1938; McQuilkin, 1940). *Diospyros virginiana* and *Sassafras albidum* in Missouri (Drew, 1942) and southern Illinois (Bazzaz, 1968), and *Juniperus virginiana* in New Jersey (Bard, 1952).

Vines, both woody and herbaceous, were numerous as to species, although only *Rhus radicans* and *Campsis radicans* show importance values greater than 10. *Campsis radicans*, an important component of community structure in the more open 15 and 17 year old fields, slightly declined in importance in the 18 year old shady crest field. *Rhus radican* was abundant and appeared regularly in a variety of sites in all fields sampled.

Rhus glabra and *Diospyros virginiana* are usually common on disturbed sites, but the significance of *Cornus racemosa* as a dominant understory species has not been reported from other areas. Caplenor et al. (1968) found that *Liquidambar styraciflua* was present in slightly disturbed forests in upland non-loess and thin loess communities in west central Mississippi, but was the major dominant on thick loess and creek bottom non-loess sites varying in pH values, while *Acer negundo* was restricted to thick loess and creek bottom non-loess only.

In the slope field, large individuals of *Carya illinoensis* contributed to this somewhat misleading, high importance value. Succession seems to indicate the future major importance of both *Acer negundo* and *Liquidambar styraciflua* with later dominance by the latter. The high importance value of *Liquidambar styraciflua* seedlings of the herb layer

supports this interpretation.

The *Liquidambar styraciflua* successional pattern continued in the crest field as evidenced by its role as the major dominant in the shrub layer and its increased importance value as a seedling. Other important components of this predominantly woodland field were *Diospyros virginiana, Ulmus alata, Liriodendron tulipifera, Quercus velutina,* and understory species, *Rhus glabra* and *Cornus racemosa.* Although secondary succession begins when tillage stops, this investigation was limited to the intense study of somewhat older fields whose herbaceous and shrub layers were well on the way to indicating a general trend to be expected. The great diversity of species is directly proportional to the floristic richness of the vegetation on the slopes and ravines within close proximity to the abandoned fields. However, chance dissemination produced unpredictable variation within communities in frequency and density values. In each field sampled, succession was more rapid in those parts of the field that were closest to a relatively undisturbed mature forest which served as a seed source. Furthermore, the favorable environment for an abundant animal population created by the forest, forest-edge and free-flowing stream served to increase the chances that seeds of plants and fruits eaten by animals would reach the fields. This was especially true of fructivorous birds that fly from forest opening to forest opening. In general, however, the first woody invaders of each field, though not necessarily maintaining high frequency and density values, were those species attractive to squirrels, *Carya illinoensis* and *Quercus velutina.*

A greater degree of correlation was found to exist between the crest and base fields in the herb layer, while in the shrub layer, the base and slope fields were more similar (Table 2).

Frequency values of species present in the herb and shrub layers of three fields, grouped according to Runkiaer's Normal (Oosting, 1942; 1956), are presented in Figures 1, 2,

TABLE 2

Similarity of Herb and Shrub Species of Each Community

	HERBS			SHRUBS		
	Base	Slope	Crest	Base	Slope	Crest
Base	100%	55%	64%	100%	75%	60%
Slope		100%	59%		100%	58%
Crest			100%			100%

and 3. Frequency diagrams are suggestive of the homogeneity of a community; the higher Class E may be, the greater the homogeneity. Most species present in the study fields were present in very small numbers and were far from evenly dispersed. In this investigation, Class A in each frequency diagram may serve to emphasize the numerous sporadic species that were found with low frequency values in each community sampled, and Class E, the small number of dominants with high frequency values. Thus, while the communities, as would be expected in the early stages of succession, are not yet homogeneous, Class E of the shrub layer in the 18 year old crest field (Figure 3) does indicate a trend toward greater homogeneity.

Deciduous forests are believed to have occupied the Mississippi embayment area since preglacial periods (Safford and Killebrew, 1904; Braun, 1950; Caplenor *et al.*, 1968). The lists of species present in the old-fields sampled in this investigation show a high degree of similarity to the composition of a primary mixed mesophytic forest described by Braun (1950) on the dissected loess bluffs near Reelfoot Lake, Tennessee. Of the 14 species listed for the

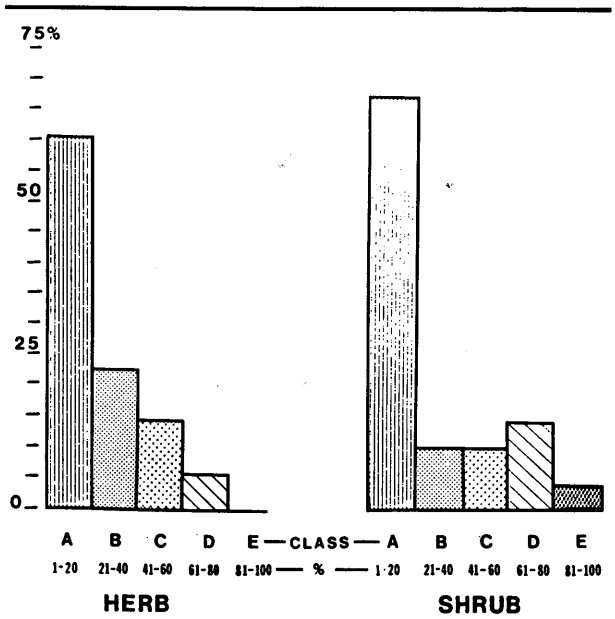

Figure 1

Frequency diagrams of species in herb and shrub layers of base old-field according to Raunkiaer's normal.

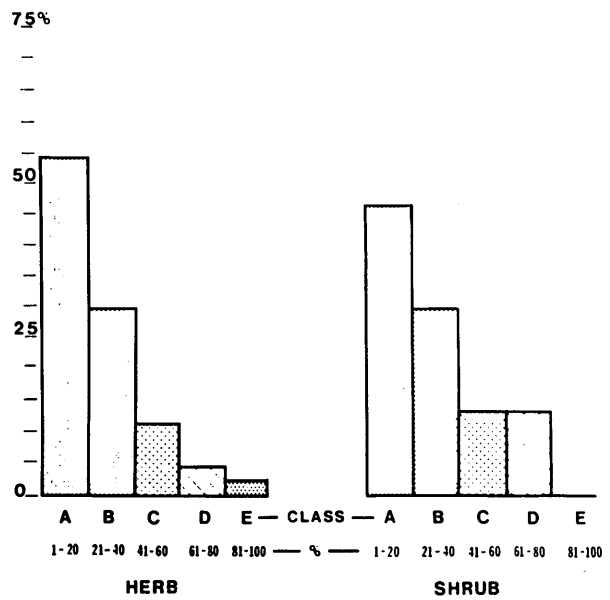

Figure 2

Frequency diagrams of species in herb and shrub layers of slope old-field according to Raunkiaer's normal.

canopy layer, 10 species, *Fagus grandifolia, Liriodendron tulipifera, Carya spp., Nyssa sylvatica, Fraxinus americana, Quercus velutina, Juglans nigra, Acer saccharum, Liquidambar styraciflua,* and *Sassafras albidum,* were recorded in the study samples. Those species represented in the understory and as shrubs and woody climbers were also similar to the ones present in quadrats in the abandoned fields on the Third Chickasaw Bluff.

On the basis of available water in loess and water of percolation in creek bottoms, Caplenor *et al* (1968) considered 9 species to be the most highly mesophytic of the important

trees of the communities sampled in west central Mississippi: Of these, *Acer negundo, Liriodendron tulipifera, Ulmus rubra, Quercus nigra, Carpinus caroliniana*, and *Carya cordiformis* appeared in the study fields.

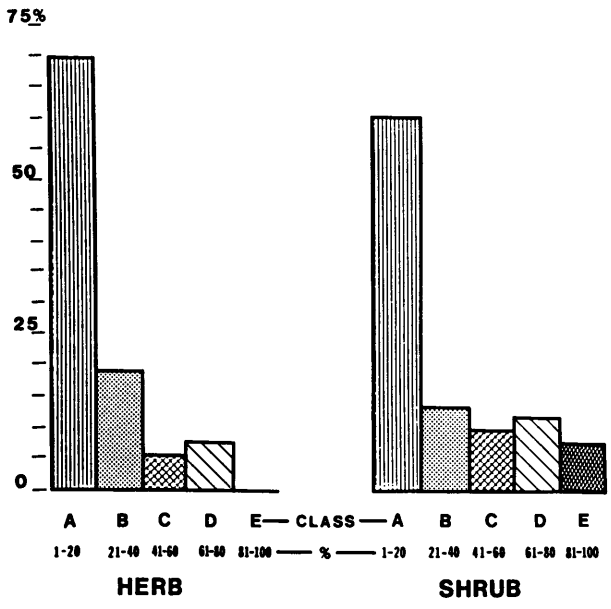

Figure 3

Frequency diagrams of species in herb and shrub layers of crest old-field according to Raunkiaer's normal.

Tilia spp. (Braun, 1950; Caplenor *et al.*, 1968), *Quercus falcata* var. *pagodaefolia*, and *Magnolia acuminata* (Caplenor *et al.*, 1968), important dominants in mixed mesophytic communitites, were not present in the old-field communities studied. However, the presence of other representative mixed mesophytic woody species would suggest a successional trend toward species composition of the mixed mesophytic forests.

CONCLUSIONS

Because so little was known about the successional patters of old-fields in the loess bluff region of southwest Tennessee, several different kinds of data and observations were needed. Quantitative vegetational analyses provided an account of the species composition and successional differences of three neighboring old-field communities on loessal soil, differing in position on the Third Chickasaw Bluff, and in age since abandonment.

The floristic similarity that exists between the abandoned fields of similar ages was strong. Structure and composition did not vary greatly with slope exposure and inclination. Changes were mainly in the relative importance of major species rather than in floristic composition. Floristic similarity may be influenced by sample number.

Several distinctive features may be emphasized in the vegetational results of the investigation: 1) The richness and variety of many accessory species; 2) The obscuring of clear cut dominance in the herb layer by the presence of codominants; 3) The appearance of *Sorghum-Solidago-Erianthus-Andropogon* as the common sequence of herbaceous dominants; 4) The importance of *Sorghum halepense* and *Erianthus giganteus*, 5) The abundance and variety of woody and herbaceous vines, of which *Campsis radicans* and *Rhus radicans* were the most important components of community structure also seen by Smith (1968) in East Tennessee and by Oosting (1942); 6) The importance of *Cornus racemosa* as a dominant understory species; 7) The occurrence of *Acer negundo* and *Liquidambar styraciflua* as the major woody dominants.

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