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ABSTRACT

A plot of land on the University of Central Arkansas campus has been permanently designated as a Nature Reserve which is to remain much as it is with woods and open, grassy fields for class use and other educational purposes. The 1.5 hectare open field is a particularly good site for prairie restoration, since the area has not been under cultivation in recent time. *Andropogon gerardi, A. scoparius, Sorghastrum avenaceum, Panicum virgatum, Liatris pycnostachya, Eryngium yuccifolium, Rudbeckia hirta,* and *Helianthus* sp. are examples of plants naturally occurring here with some frequency. A number of other plants typical of prairie remnants in Arkansas occur but some are in smaller numbers. Vegetation monitoring has included compilation of a species list and frequency of species sampled during the fall of 1981 as well as gathering of quantitative data on the percent cover. Restoration has included elimination of some encroaching woody species and burning as well as a program involving seed collection, sowing and transplant operations.

INTRODUCTION

On June 18, 1980, at the request of the Biology Department, the UCA Board of Trustees set aside 4.1 ha of unspoiled land as a Nature Reserve. This tract, located on the west side of the UCA campus bordering Farris Road in Conway, consists of an approximately 1.5 ha open field surrounded on three sides by a southern red oak-sweet gum forest. The close proximity of this open field to grassland which appears to be prairie remnant may indicate that it, too, once supported prairie vegetation. The reserve is adjacent to a larger track of land, extending approximately 0.8 km to the south and 6.4 km along highway 286, where open fields of 4-40 ha exist that are mowed for hay or grazed by cattle. One of these, a 7-8 ha field, supports growth that could be considered to be a portion of remnant prairie, although not in prime condition (Culwell, 1980). Here large numbers of *Castilleja coccinea* (Indian Paintbrush) and other species typical of Arkansas prairie can be found. An adjacent 28 ha has vegetation similar to that on the Henze property although this grazed and mowed land has not been extensively studied.

The small size of the open field in the UCA Nature Reserve may be quite typical of many "outlyer" prairie areas that once were in Arkansas (Irving and Brenholts, 1977). The prairies of central Arkansas, on the eastern edge of the true western prairies, were often isolated within deciduous forests in the more mesic midwest; such areas, extending as far east as Pennsylvania and south to Louisiana, were called "outlyers." A number of species in the open field of the UCA Nature Reserve appear to be those of prairies that were typical in central Arkansas around 1900 (Arkansas Department of Planning, 1974). Land use of the open UCA field has been one or two annual mowings for hay during the past 35 years; cultivation has not occurred here in recent time if at all.

Soil of the UCA prairie which is of the Taft series, consists of silt loam underlain by silt clay loam that restricts root and water movement; the water table is within 30 to 61 cm. of the soil surface during rainy periods of the winter and spring. This soil, pH 4.5-5.5 (derived predominantly from shale and sandstone), is poorly drained (USDA, 1979).

SAMPLING METHODS

To assess the condition of the open field as a prairie prior to extensive restoration management, analysis of the current vegetational patterns is necessary. Fall flora was measured during September, 1981, through the use of 15 line transects. Data were analyzed for cover and frequency. Based on apparent vegetation and topography there seemed to be three somewhat different portions to the prairie area which were sampled as separate units for comparison (six 10 m transects in two areas and three 10 m transects in the other). Species present in the open field, but not sampled with the above technique, have been recorded (Table 1); nomenclature follows that of Smith (1978); voucher specimens have been deposited in the UCA Vascular Plant Herbarium.

Table 1. Species Present but not Intercepted by Line Transects Made During September 1981.

Apiaceae		
	Eryngium prostratum Nutt.	
Asclepiadaceae		
	Asclepias sp.	
Asteraceae		
	Ambrosia bidentata Michx.	Ragweed
	Boltonia diffusa Ell.	Boltonia
	Erechtites hieraciifolia (L.) Raf.	Fireweed
	Helenium flexuosum Raf.	Sneezeweed
	Helianthus mollis Lam.	Ashy Sunflower
	Solidago leptocephala T. & G.	
	Solidago nemoralis Ait.	Old-field Goldenrod
Hypericaceae		
	Hypericum drummondii (Grev. & Hook.) T. & G.	Nits-and-lice
	Hypericum mutilum L.	Dwarf St. John's-wort
Liliaceae		
	Smilax glauca Walter	Greenbrier
Scrophulariaceae		
	Bacopa acuminata (Walt.) Robins	Water Hyssop
	Buchnera americana L.	Blue Hearts
	Gratiola viscidula Pennell	Hedge Hyssop
	Lobelia sp.	
	Penstemon alluviorum Pennell	Beard Tongue

SAMPLING RESULTS AND DISCUSSION

Analysis of the fall flora shows *Andropoon scoparius* to be the single highly dominant species (50% cover; see Table 2). It has long been known that *A. scoparius* is the dominant species of upland or drier prairie sites while *A. gerardi* is more typical of lowlands (Weaver, 1954). The drier portions of the UCA prairie supported scattered stands of *A. gerardi* while *A. scoparius* was widely found, even in the more mesic areas. Irving et al. (1980) state that *A. virginicus* and *A. ternarious,* although atypical species, are dominants of nearly all burned and mowed prairies of east-central Arkansas. Perhaps *A. scoparius* is dominant on the UCA tract due to lighter land use over the years. Sub-dominants included *A. virginicus* and *Aster pilosus* (10 - 15% cover). All other species sampled had cover less than 7.2% (Table 2). Density data are

not presented, since the sod-forming grasses are not comparable with forbs. The line transects intercepted 46 species.

The three sections of prairie that appeared to be topographically and vegetatively different prior to sampling where shown to be so. The northern portion, flat but reasonably well-drained, had virtually continuous cover by *Andropogon scoparius* (88%). The southeastern portion, the lowest section of the field where the soil is frequently very wet during periods of greater rainfall, included *Andropogon scoparius* (18% cover); *A. virginicus* (36% cover) and *Aristida* sp. (13% cover) as co-dominants. On the southwestern portion, which was on the highest elevation and driest soil, *Andropogon scoparius* (37% cover), *A. gerardi* (17% cover), and *Sorghastrum avenaceum* (8% cover) were dominant (the latter two species were very scarce elsewhere in the prairie).

Table 2. Mean Per Cent Cover and Frequency for Species Sampled by Line Transect on the Prairie of the UCA Nature Reserve, September 1981.

Species		% Cover	% Frequency
Andropogon scoparius Michx.	Little Bluestem	50.1	100
Andropogon virginicus L.	Broomsedge	15.5	80
Aster pilosus Willd.	White Heath Aster	13.4	100
Aristida sp.	Three-awn	7.2	80
Sorghastrum avenaceum(Michx.) Nash	Indian Grass	4.4	47
Panicum anceps Michx.	Beaked Panicum	3.6	67
Andropogon gerardi Vitman	Big Bluestem	3.4	20
Vernonia missurica Raf.	Ironweed	3.1	73
Paspalum floridanum Michx.	Florida Paspalum	2.7	20
Liatris pycnostachya Michx.	Button Snakeroot	2.5	20
Bidens frondosa L.	Beggar Ticks	2.2	14
Crotonopsis elliptica Willd.		1.9	67
Paspalum laeve Michx.	Field Paspalum	1.8	73
Panicum scoparium Lam.	Velvet Panic	1.6	60
Pycnanthemum tenuifolium Schrader		1.6	53
Poaceae sp.		1.5	33
Aster paludosus Aiton subsp. hemisphericus (Alex.) Cron.	Stiff-leaved Aster	1.3	33
Helianthus angustifolius L.	Narrow Leaf Sunflower	1.0	47
Tephrosia onobrychoides Nutt.	Hoary Pea	0.9	40
Gerardia fasciculata Ell.		0.9	47
Panicum sp.		0.7	47
Panicum virgatum L.	Switchgrass	0.7	7
Rhexia mariana L.	Meadow Beauty	0.6	47
Andropogon sp.		0.5	20
Eupatorium rotundifolium L.		0.5	13
Heterotheca villosa (Pursh) Shinners		0.5	13
Diodia teres Walter	Rough Buttonweed		
Diodia virginiana L.	Buttonweed	0.5	27
Paspalum sp.		0.5	33
Setaria geniculata (Lam.) Beauv.	Knotroot Brittlegrass	0.5	7
Tridens strictus (Nutt.) Nash	Longspike Tridens	0.5	27
Ruellia sp.		0.4	27
Eryngium yuccifolium Michx.	Rattlesnake Master	0.3	13
Heterotheca graminifolia (Michx.) Shinners	Grass-leaved Golden Aster	0.3	33
Rubus sp.		0.3	20
Rudbeckia hirta L.	Black-eyed Susan	0.2	20
Poaceae sp.		0.1	7
Hypericum sp.		0.1	13
Liquidambar styraciflua L.	Sweet Gum	0.1	7
Paronychia sp.		0.1	7
Pycnanthemum muticum (Michx.) Pers.	Mountain Mint	0.1	7
Quercus sp.	Oak	0.1	7
Sorghastrum sp.		0.1	7
Spiranthes sp.	Ladies'Tresses	0.1	7
Strophostyles umbellata (Muhl. ex. Willd.) Britton		0.1	13
Poaceae sp.		0.1	7

RESTORATION MANAGEMENT

Current restoration procedure since designation of the Nature Reserve has included a burn conducted on March 9, 1982. Very little new spring growth had emerged by that time; the soil was quite wet and the early morning moisture prevented flame from reaching the ground surface where a few buds had burst. Kucera (1970) estimated that a three-year interval between burnings is feasible to maintain gross dominance and still retain species diversity of forbs typical of the native plant community. As of April 1, 1982, the burn appeared to have killed aboveground portions of the majority of encroaching woody seedlings that had grown during 1981.

Approximately 0.2 ha of woody sapling and tree growth has been cut where encroachment upon the open field was greatest. Kilburn (1970) strongly recommends painting the cut stumps with a mixture of 2, 4-D and 2, 4, 5-T mixed with fuel oil to kill the root system thus preventing sprouting, which will be done where fire has failed to control woody growth. Plans for 1982 include vegetation analysis during May and again in July.

Seeds from native prairie remnants have been collected and stratified (Schopmeyer, 1974) for planting in randomly cultivated areas within the prairie (Rock, 1977). These species include: *Lespedeza capitata, Echinacea pallida, Buchnera americana, Helianthus mollis, Penstemon* sp., *Camassia scilloides, Chrysanthemum leucanthemum, Silphium laciniatum* and *Dianthus armeria.*

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