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PRAIRIE VEGETATION IN NORTHWEST ARKANSAS

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The climax vegetation of northwest Arkansas is generally admitted to be deciduous forest which is bordered by the Tall Grass Prairie on the west and the Lake Forest on the north. The great climatic changes of the past have permitted the movement of the boundaries of the deciduous forest and the grassland. These movements have resulted in the isolation of fragments of both climaxes within the now recognized boundaries of the opposite formation. One of the more famous isolated areas is the Cross-timbers found in Texas. The Cross-timbers is a portion of the deciduous forest completely isolated in the grassland formation. This area is post-climax to the grassland formation. Similarly, grassland areas in the deciduous forest are pre-climax. Pre-climax grassland formations such as the Grand Prairie are to be found in the state of Arkansas. Other areas less well known are the following: The Massard Prairie and the Cedar Prairie near Fort Smith in western Arkansas. The Norwood Prairie, west of Fayetteville, and the Lindley and Osage Prairies, shown in Figure 1.

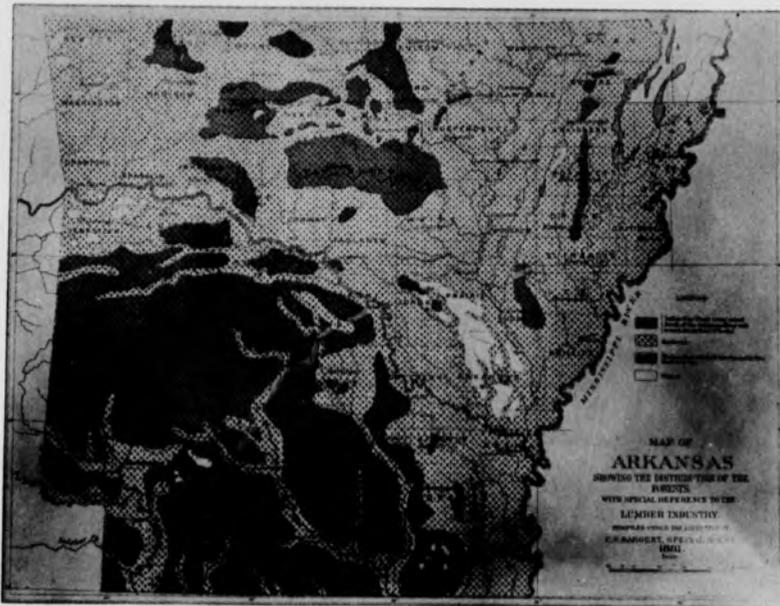


Figure 1. Vegetational Map of Northwest Arkansas. The Shaded Sections Represent the Various Areas of Prairie Vegetation.

These prairie areas are located in the basins and are surrounded by mountains covered with vegetation of the deciduous forest. Nuttall (1819) stated that the Grand Prairie would be suitable for rice culture. Today, this observation has been completely fulfilled, by the Grand Prairie area being the center of rice production.

Lesquereux (1856) studying the coal deposits of Arkansas recorded the presence of prairie areas. His observations were similar to those of Nuttall. Sargent (1880) shows these various prairie areas in his vegetational map of Arkansas (Figure 1).

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The Norwood Prairie. The Norwood Prairie is located in the northwest part of Arkansas. It lies west of Fayetteville and is west of the Wedington Gap. The original vegetation of this prairie has been destroyed, with the exception of a few isolated areas which attest to its former status before the advent of the plow. The few areas that have not been plowed have been used as permanent pasture and heavily over-grazed until a grazing disclimax is now found throughout the prairie.



Figure 2 (above). A typical pasture in the Norwood Prairie of Northwest Arkansas. Figure 3 (left). Typical community of Indian Grass in Massard Prairie.

Figure 2 shows a typical pasture in the Norwood Prairie at the present time. The long and continuous grazing has permitted the invasion of other grass species and an increase in certain less palatable species. Kentucky bluegrass (*Poa pratensis*) and broomsedge (*Andropogon virginicus*) have become the dominant species represented in the vegetation of this pasture. The tall grass vegetation has been almost completely eliminated. Intermittent mowing has been practiced on this pasture with the result that the woody and herbaceous species have not increased.

The stage of deterioration of the Norwood Prairie and similar prairie areas is easily measured by the abundance of broomsedge that is present. Kentucky bluegrass appears to serve as one of the early indicators of overutilization. Continued deterioration is apparently well indicated by the presence of broomsedge. Other indicators of deterioration of the prairie vegetation are the herbaceous species common to the deciduous forest. The broomsedge also represents the vegetation of a fire-disclimax in this area.

The Massard Prairie¹. The Massard Prairie, south of Fort Smith, is located in a basin lying between two hills known locally as Wolf Mountain and South Ridge which have elevations of about 600 feet. The prairie has an elevation of about 500 feet. Massard creek crosses the prairie from southwest to northeast. The surface of the prairie is gently rolling and contains many small mounds which are three to four feet in height and some twenty feet in diameter.

¹From "A Study of the Flora of Massard Prairie with Some Ecological Notes," by M. R. Armstrong.

The plant societies found in the Massard Prairie are representative of the Tall Grass Prairie formation (Figure 3). The typical grasses found in the Massard Prairie are big bluestem (*Andropogon furcatus*), little bluestem (*Andropogon scoparius*), Indian grass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). Table 1 lists the various Gramineae genera common to the Massard Prairie, while Table 2 lists the dominant grasses. Some of the species found on the Massard Prairie are neither common nor even listed as being present in the Tall Grass Prairie to the west and north. This is probably due to climatic changes associated with the southern position of Arkansas in the vegetative formations. That is, certain of these species are not adapted to the lower temperatures found further north and west. Rainfall may also be another of the deciding factors which prevents their spread. However, the interaction of climatic effects may often be more important than the main effects acting alone.

TABLE 1. The Grameneae genera common to the Massard Prairie.

Genera	No. of Species	Genera	No. of Species
Agrostis	3	Panicum	10
Andropogon	4	Paspalum	4
Aristida	4	Phalaris	1
Bouteloua	1	Setaria	1
Bromus	1	Sorghastrum	1
Danthonia	1	Sorghum	1
Digitaria	1	Sphenopholis	1
Echinochloa	1	Sporobolus	3
Elymus	1	Tridens	2
Eragrostis	3		
Festuca	1		
Leptoloma	1		

TABLE 2. The dominant grasses found on the Massard Prairie.

<i>Andropogon furcatus</i>	Big bluestem
<i>Agrostis hyemalis</i>	Ticklegrass
<i>Andropogon scoparius</i>	Little bluestem
<i>Aristida gracilis</i>	Slender triple awn
<i>Bouteloua curtipendula</i>	Side-oats grama
<i>Eragrostis pectinacea</i>	Purple Love-grass
<i>Panicum agrostoides</i>	Red-top panic
<i>Panicum capillare</i>	Witch grass
<i>Paspalum floridanum</i>	Florida paspalum
<i>Sphenopholis intermedia</i>	Slender wedge grass

TABLE 3. The major taxonomic families found on the Massard Prairie.

Tribe	No. of Genera
Gramineae	21
Cyperaceae	6
Liliaceae	4
Caryophyllaceae	3
Ranunculaceae	3
Cruciferae	6
Rosaceae	3
Leguminosae	18
Euphorbiaceae	6
Onagraceae	4
Unbelliferae	8
Asclepiadaceae	3
Labiatae	5
Solanaceae	3
Scrophulariaceae	8
Compositae	37

The great number of tribes and genera (Table 3) present in the Massard Prairie gives it a taxonomic complexity which is quite common in the prairie areas of the United States.

Climatically, the area should be considered as being marginal for the growth of trees. The normal rainfall (38.93 inches) is adequate for tree growth if other factors are favorable. Soil conditions may be the primary factor preventing the climax vegetation from becoming established. The soils in the prairie areas of Arkansas are cold, wet soils which are underlain by a clay or shale hardpan. This hardpan is the cause of the soils being wet during the rainy months and also results in a droughty soil during the summer months when precipitation is low. The impermeability to water of the clay-pan is the reason that rice can be successfully produced on the Grand Prairie.

The germination and growth of tree seedlings seems to be inhibited by the cold, wet soil conditions that prevail in this area plus the droughty condition of the soil during the summer months.

Relic Tall Grass Vegetation on the Mountain Slopes of Northwest Arkansas. In the northwestern portion of Arkansas, remnants of the Tall Grass Prairie are evident in sites other than those shown in Figure 1. A typical area in Washington County is shown schematically in Figure 4. This area is east of the Norwood Prairie and consists of approximately 20 acres. It has not been fenced nor grazed. The area consists of a ravine lying between two formerly cultivated fields. The field on the west ridge has been abandoned for a considerable period of time and has been revegetated with trees and broomsedge (Figure 5). The east ridge was sown to Korean lespedeza and has been allowed to reseed itself every year. During the winter of 1951-1952, the area was leased to a Texan who put in fences and developed stock ponds.

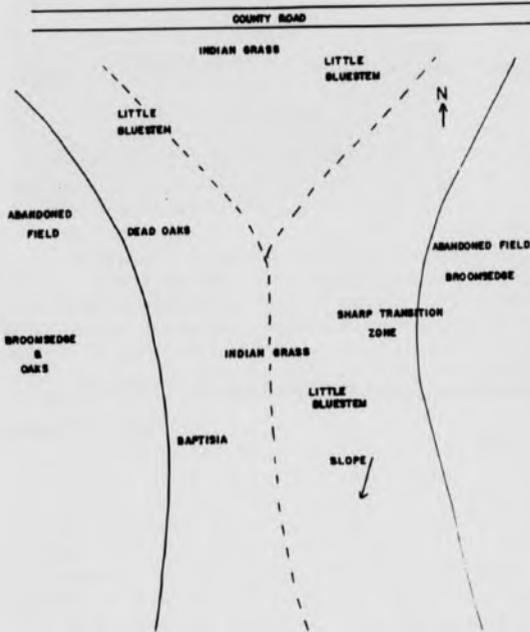


Figure 4 (left). Schematic Illustration of the Prairie Flora of a Northwest Arkansas Hillside. Figure 5 (above). Abandoned Field being revegetated with Oaks and Broomsedge.

The vegetation on the slopes of the ravine primarily is little bluestem and Indian grass. Little bluestem was estimated as providing 65 per cent of the vegetative cover and the Indian grass 30 per cent. The other 5 per cent of the vegetative cover was trees and miscellaneous forbs. Baptisia species were found to be present in this area. It is significant to note that there was not one plant of broomsedge within the boundaries of the native grass area, whereas it was found in profuse abundance in the fields on either side of the ravine. A sharp ecotone existed between the native grass area and the previously cultivated areas.

There are few stumps in the native grass area, indicating that previous forest cover was limited to isolated trees that were probably established during periods of optimum conditions and made the minimum essential growth before the competition and occasional fire could destroy them. The sprouts of sassafras and oak which are now found in the area are nearly all dead. They apparently have been killed by fire as indicated by their blackened condition. Residents of the area say that burning has not been practiced.

On the abandoned cultivated field to the west of the area, there are two apparent successional responses. One is the immediate increase in the abundance of broomsedge, and secondly, the slower but nevertheless consistent increase in deciduous type of woody vegetation.

The soil in this ravine and on the ridges is rocky, most of the rocks being smaller than 3 inches in diameter. The perennial vegetation concealed the rocky soil from the casual observer. Erosion is practically nonexistent. There were no cases of accelerated erosion. The rocks are very evident in the abandoned fields.

Examination of these areas indicates that Northwest Arkansas is truly a transitional zone. The deciduous forest can be said to be the climax vegetation. There are indications that the grassland vegetation and the deciduous forest are codominant in nature. Topographical and edaphic features apparently provide slight advantages and disadvantages for each of the formations and thus determine which of the vegetational types would prevail under natural conditions.

On the basis of this material, it is quite possible for proper management to develop in northwest Arkansas pastures consisting of perennial prairie grasses. This would necessitate the maintenance of the areas in a disclimax condition and would require constant effort to prevent the development of herbaceous and woody species.

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