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MACLURA POMIFERA (RAF.) SCHNEID. IN COLES COUNTY, ILLINOIS

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ABSTRACT: -- A comparison of the present extent of Maclura pomifera (Raf.) Schneid. hedgerows with the amount found in 1938 aerial photographs shows a decrease of about 85% in total hedgerow length in the northern half of Coles County, Illinois. Natural reproduction of osage orange, however, is extensive in this area. On three lowland pasture sites osage orange was found to rank second in density, being one of the commonest thorny species present.

INTRODUCTION

Early Illinois settlers had many problems in taming the tall grass prairie. One of the most perturbing was the lack of fencing material. In Eastern United States timber could be split or stone found for fence construction. On the prairie, however, wood was at a premium and the construction of fences was a major problem. Since wood was scarce and wire fence unrealistic, numerous types of hedges, or "living fences" were considered. Most of the native thorns were used, including red haw, crabapple, and honey locust. They all proved to be unsatisfactory as did many introduced species (Hunter, 1970). In 1847, Professor Johnathan Turner introduced Maclura pomifera (osage orange) into Illinois (Carriel, 1961). This species fit all the requirements of the settlers. It grew fast, was easily started, could survive the climate of the prairie, was armed with stout thorns, was not attacked by most animals and insects, and produced a tight hedge (Gates, 1960). With the invention of the wire fence during the late 1800's, and the continued mechanization on the farm, the longevity of the hedgerow became limited. Once the trees were allowed to mature, the shallow root systems expanded well beyond the dripline and absorbed much of the available water and nutrients. Very few crop plants could compete with it (Baumgardt, 1972). On the Illinois prairie the coming of barbed wire meant the gradual grubbing out of many miles of osage orange, a process that is still continuing.

The present study was undertaken to determine the amount of remaining osage orange hedgerows and the extent of natural reproduction of osage orange in the northern half of Coles County, Illinois. The area studied included all county land north of Illinois Route 16 and totals 332 square miles. This part of the county is largely cultivated, and is located in the extreme southern part of the Grand Prairie Section of the Grand Prairie Division (Schwegman, 1973).

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MATERIALS AND METHODS

The present extent of osage orange hedgerows in the northern half of Coles County, Illinois was determined by driving the roads of this area during the winter months of 1975. Each hedgerow was marked on a county highway map and its length recorded to the nearest twentieth of a mile. The extent of hedgerows in the same area about 40 years ago was determined by using 1938 aerial photographs. These photographs were made available by the Coles County ASCS-SCS offices, and have a scale of 1:20000 or four inches equaling one mile.

To determine the amount of natural reproduction of osage orange, the three lowland pastures listed below were surveyed. In each area two to four quadrats, 25 m on a side, were randomly located. In each quadrat the diameter class, and species of each individual was recorded. From these data the density (Ind. / ha) of seedlings (over 1 foot in height but less than 1 inch dbh.), saplings (1 to 4 inches dbh.), and trees (greater than 4 inches dbh.) was determined for each species. The nomenclature used follows Jones (1963).

Area A. Lowland area dissected by a small unnamed creek that flows into the Kaskaskia River about 1 mile away. This area is pastured, and is located about 2 miles south of Cooks Mills, Illinois (SW¼ Sect. 21 T13N R7E).

Area B. Lowland area at the edge of Greasy Creek about 1 mile from where it flows into the Embarras River. This area is pastured, and is located about 2½ miles north of Rardin, Illinois (SW¼ Sect. 21 T14N R10E).

Area C. Lowland area along Greasy Creek that is no longer pastured. It is located about 1½ miles NW of Rardin, Illinois (SW¼ Sect. 29 T14N R10E).

RESULTS AND DISCUSSION

The results of the present study show that there has been a significant decrease in the number and extent of osage orange hedgerows in Coles County during the past 37 yeras. In 1975 a total of 95 hedgerows remained in the survey area with a total length of 15.1 miles, while the 1938 aerial photographs showed that there were 329 hedgerows totaling 104.9 miles. This represents a decline of about 85% in total hedgerow length.

At the present rate of removal, osage orange hedgerows will soon disappear. This species, however, has become established in many lowland pastures. These areas are quite similar to the natural habitat of osage orange in the rich river bottoms of the Red and Arkansas Rivers. Soil moisture appears to be a key factor in osage orange establishment since nearly all of the trees observed are on lowland or terrace sites.

To determine the extent of osage orange establishment three study areas, located in lowland pastures, were surveyed (Table 1). A total of 13 woody species were found in the study areas. Four thorny species dominated the pastures along with three non-thorny species. Crataegus mollis Gleditsia triacanthos, Maclura pomifera, and Malus ioensis are the dominant thorny species present and usually rank very high in all diameter classes. On all three areas studied osage orange ranked second in total number of individuals per hectare. This is a good indication that it can successfully

Table 1. Tree density (Ind. / ha) by diameter class in the three grazed areas where Maclura pomifera (Raf.) Schneid. is common.

SPECIES	DENSITY (IND. / HA) BY DIAMETER CLASS								
	AREA A			AREA B			AREA C		
	1"	1"-4"	4"+	1"	1"-4"	4"+	1"	1"-4"	4"+
Crataegus mollis (T.& G.) Scheele	304	336	32	232	344	---	16	160	320
Gleditsia triacanthos L.	96	104	8	244	488	52	---	---	16
Maclura pomifera (Raf.) Schneid.	56	80	176	84	456	40	---	104	200
Juglans nigra L.	72	112	8	48	72	4	---	---	---
Ulmus americana L.	24	96	---	52	228	48	8	40	56
Malus ioensis (Wood) Britt.	16	40	---	60	36	4	---	---	---
Celtis occidentalis L.	8	24	16	---	---	---	56	104	16
Prunus serotina Ehrh.	40	8	---	28	16	---	---	---	---
Quercus imbricaria Michx.	16	---	8	4	---	---	---	---	---
Carya cordiformis (Wang.) K. Koch	8	---	---	12	4	---	---	---	---
Fraxinus lanceolata Borkh.	---	---	---	16	52	8	---	---	---
Morus rubra L.	---	---	---	4	---	---	---	---	8
Acer saccharinum L.	---	---	---	---	---	---	8	---	---
Totals	640	800	248	784	1696	156	88	408	616

compete with other woody species in grazed areas. One reason for its success is that osage orange is a thorny species and therefore relatively unpalatable to livestock. In the pasture habitats studied the unpalatable species have been released from competition by the elimination of the palatable ones by grazing. Many of the natural occurring woody taxa in these lowland habitats are thornless, thus being desirable forage plants.

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