



Mesquite Agroforestry Potential

J.D. LAXSON, W.H. SCHACHT, AND M.K. OWENS

BOTTOM LINE

Mesquite agroforestry systems, with large trees on relatively wide spacings, could provide rapid growth rates of the wood and high levels of forage production in the understory.

Summary

- Growth rate in the basal diameter of mesquite is similar to other, commercial hardwoods.
- Growth rates in wet years may be as high as 0.5 in. increase in basal diameter.
- Herbaceous production increases significantly when mesquite trees are reduced to 120 or fewer stems per acre.

Introduction

Honey mesquite (*Prosopis glandulosa*) dominates nearly 57 million acres of rangeland in Texas and is generally considered the most troublesome woody plant species in the state. It establishes under a wide range of environmental conditions and withstands repeated top removal. Limited information is available on the production and growth rate of mesquite trees under agroforestry management. Mesquite has the potential to grow at favorable rates and to produce high quality wood for various markets including: firewood, barbequewood, flooring material, and lumber for high quality furniture. The objectives of this study were to 1) determine biomass yields of wood and herbage at 5 levels of honey mesquite density, and 2) determine the growth rate of mesquite trees at 5 different stand densities.

Experimental Approach

The study was conducted on the Angelo State University Management, Instruction, and Research Center about 6 miles northwest of San Angelo, TX. Fifteen 1-acre plots were selected in a 25 year-old stand of honey mesquite. Three plots were assigned to each of 5 treatments: 1) Unthinned native stand (3,000 stems per acre), 2) cleared, or thinned to 3)

40, 4) 120, or 5) 360 stems per acre. Tree diameter growth rate, canopy biomass, and herbaceous understory biomass were sampled annually for two yr after the thinning.

Results

Reducing honey mesquite density to 360 stems per acre had no effect on basal diameter growth rates of trees < 3.5 in. diameter compared to growth rates in the unthinned native stand. Trees larger than 3.6 in. diameter had higher growth rates after thinning, if rainfall was above average. When rainfall was average, or below average, growth rates were similar in all of the thinned and unthinned treatments (Table 1). Growth rates measured for mesquite trees were similar to growth rates reported for other hardwood species such as oak, birch, cherry and maple. Under these conditions, it may be possible to grow high quality mesquite for the lumber market.

Total removal of the mesquite canopy resulted in a 45% increase in herbaceous standing crop compared to the controls (Table 2). Compared to the cleared treatment, mean herbaceous standing crop was reduced at mesquite densities between 120 and 360 stems per acre. This corresponds to a canopy coverage of 37 to 61%.

Continued

Table 1. Mean basal diameter growth rates of mesquite at 4 densities near San Angelo, TX.

Mesquite density (stems/acre)	<u>Trees <3.6" diameter</u>	<u>Trees > 3.6" diameter</u>	
	All years	Wet Year	Dry Year
	-----inches per year-----		
40	--	0.51	0.28
120	--	0.47	0.28
360	0.19	0.24	0.31
3000	0.12	0.16	0.24

Table 2. Mean herbaceous standing crop at 5 mesquite densities.

Treatment	Total Herbaceous Standing Crop
	(lbs per acre per year)
Cleared	2,389
40	1,910
120	2,059
360	1,795
3000	1,645