



**Southern Indiana Purdue Agricultural Center
Forestry Research**

Title: Prescribed grazing – a surrogate for prescribed fire for recruiting oak regeneration?

Cooperators: Purdue FNR, Animal Science, Ag. Centers, Kentucky State Univ.

Funding: Mary S. Rice grant.

Date Initiated: 2013

Location: SIPAC, I, N, P

Background

Fire is now recognized as an important historical force in promoting and maintaining oak-dominated forests. Prescribed fire is used on a limited scale in Indiana to encourage the development and recruitment of oak regeneration. Its use is limited primarily to public lands. Prescribed grazing is a well-established tool used by land managers in western U.S. rangelands to control undesirable, invasive vegetation. It is beginning to gain acceptance as a vegetation management tool in the eastern U.S., particularly in the control of non-native invasive vegetation. No research exists on the use of prescribed grazing in managing forest vegetation for recruitment of oak regeneration in oak shelterwoods. Prescribed grazing may provide an alternative on lands not conducive to prescribed fire, such as private lands.

Objectives

1. Test short duration, intensive grazing, using goats, for reducing vegetation competing with established oak seedlings in oak shelterwoods.
2. Determine species preferences for goats in a forest environment and potential impact of goat browsing on oak seedlings.
3. Measure and compare impacts of prescribed goat grazing and prescribed fire to native vegetation.

Sites: Upland, unglaciated sandstone-shale soils of Gilpin series. WO SI₅₀ = 80

Stands: Mature oak and oak-hickory forests.

Treatment Area: 12 acres

Stand stocking:

Stand Stocking	Tract			Mean
	I	N	P	
Overstory basal area	(ft ² /acre)			
White oak	18	40	97	55
Red oak	45	24	11	29
Black oak	3	10	6	6
Total oak	66	75	113	89
Other species	74	29	16	43
Total overstory	141	104	129	132
Mid- and understory basal area	27	23	29	28
Total basal area	168	127	158	160

Treatments

- 2005, November 1- Designated transects were disked to incorporate acorns into the soil using a 6 ft wide double row disk drawn by a 24 hp John Deere 855 4x4 diesel tractor with extra weight mounted to the front end. Disked transects were 6 ft wide and disked to a depth of 3 to 6 in. 17% - 26% of tract areas were disked.
- 2006, late June - Midstory removal – all stems >1 in. dbh killed or cut using three different midstory removal methods plus a no treatment control.
- 2013, July 16 – August 9 – 36 cross-breed (Kiko, Boer, Savannah, Spanish influenced) non-lactating doe meat goats/acre prescribe graze/browse designated treatment plots.
- 2014, spring – Prescribed fire treatment will be applied along with a second year of grazing.

Results

Oak regeneration was mostly under 2 ft. tall. Competing vegetation was primarily blackberry, with many other mostly native species, forming a dense understory canopy over the oak seedlings. Almost all species were grazed and browsed, including oaks. Blackberry did not at first appear to be preferred as the goats started with foliage underneath the main blackberry canopy. Eventually, the taller blackberry was grazed and defoliated. Only when nothing else was available did the goats ride down tall hardwood saplings like ironwood, ash, black cherry, and tulip poplar and defoliate them. Only a small number of species were avoided by the goats, most prominently, pawpaw.

Although the grazing apparently damaged oak regeneration and competing vegetation alike, so prescribed fire will top kill oak and its competition. Long term results will reveal whether oak regeneration will benefit from prescribed grazing or be harmed.

Planned Management

Prescribed grazing will be applied again in spring of 2014. The prescribed fire treatment will also be applied in spring 2014. Overstory will be thinned to a uniform stocking to create a shelterwood.