

## Kudzu - goat interactions

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Researchers at Tuskegee University have joined together to study the impact of grazing Angora goats on kudzu (*Pueraria lobata*). A pilot project funded by the Southern Forest Experiment Station of the USDA Forest Service was started in 1990. The problem was to find an environmentally acceptable way to control and eradicate kudzu in forest situations.

Kudzu was first introduced into the United State at the Japanese Pavilion at the Philadelphia Exposition in 1876. At this time, the plant gained immediate acceptance as a landscaping material. About the turn of the century, it was realized that kudzu had some favorable properties for livestock fodder and it was promoted as a pasture crop. In the 1930's when the Soil Erosion Service (now the Soil Conservation Service) (Laycock 1983) was formed, it promoted the use of kudzu to stop gulleying and erosion. At one point, there was a government nursery in Americus, Georgia that was distributing a million kudzu seedlings per year to southern landowners (Stevens 1976). The very quality of rapid growth, deep penetrating roots, nitrogen fixation and ground cover that was relied upon to solve a problem; has instead become a problem itself. (Anon. 1979). Even though kudzu has desirable properties and is edible, it has covered a large acreage of land which could be much more profitably utilized. In Alabama, the Soil Conservation Service (Johnson 1991) estimates that there are 254,673 acres of kudzu. Southwide estimates run from two to four million acres.

The problem is that kudzu has a large fibrous storage root system that is difficult to control. Herbicides are effective if used at least twice a year for five continuous years. Obviously, this is expensive and has an implied threat of environmental contamination. The pilot project on the Tuskegee National Forest in Alabama was designed to demonstrate that Angora goats could be used to eradicate kudzu in forest situations.

A three acre test site was divided into two areas with two different grazing intensities -eight goats per acre and four goats per acre. The entire test site was machine planted to loblolly pine (*Pinus taeda* L.) in March, 1990. Six control plots were located within the two grazing areas. The goats were introduced to the test site in August, 1990 and left till frost - October 12, 1990. The goats were again placed on the area in May, 1991 and left till frost October 20, 1991.

Animal nutritionists monitored the health and weight gains of the goats. During the first season, the goats

gained about 200 pounds per acre. In the second season, the weight gains were much less being under fifty pounds per acre. There were no health or predator problems.

What about the pine? Prior to the introduction of the goats, there was 89.9% survival of the planted pines (Table I). Growth and development of the young pine was normal. As soon as the goats were placed on the area, they began to browse on the pine. In fact, the first vegetation that they chose was the nitrogen rich pine nursery seedlings. The performance of the pine began to decline and continued as long as there was grazing on the area.

In the second season, the pine recovered from previous browse damage and began to grow in a normal manner. Shortly after the goats were returned to the area, the negative impacts on growth were observed. In the high intensity grazing area, no pine survived. In the low intensity grazing area, 23% survived but with 100% browse damage. It is highly unlikely that any of these pine will mature.

The control plots present an interesting comparison with over 80% pine survival; however, the kudzu is so lush that it is smothering and breaking the pine with the indication that very few would ever mature. One might conclude that you should not plant kudzu areas to pine prior to controlling the kudzu.

Now, what about kudzu? In the high intensity grazing area, in both years there was no visible kudzu prior to frost. In the low intensity grazing area kudzu was roughly 65% controlled in the first year and 80 - 85% controlled in the second year. The storage capacity of the roots remains and unless grazing is continued for another one to three years, the kudzu will reclaim the area. The heaviest grazing on kudzu occurs from early August until late September. The deep roots of the kudzu are able to reach water during drought periods and retain their palatability much longer than other native vegetation. Because of this, it is not necessary to place goats in a kudzu control area until late July and then be prepared to move them to winter pasture immediately after the first frost. When the kudzu is removed, other plants invade the area and take its place. Two invaders are trumpet vine and ragweed, but both can be controlled with herbicides.

No supplemental feeding was provided to the goats. In the first year, the goats gained about 200 pounds per acre. In the second year, the goats gained far less

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-about 25 pounds per acre. This is based on entry- exit weighings and is a reflection on the amount of edible biomass available on the site for the duration of the grazing period. There was no negative impact on mohair quality or quantity from the kudzu grazing. With proper timing the goats can perform well on patches of kudzu.

There was some soil compaction along the travel routes of the goats, but it did not appear to cause any problems since the area was virtually level. On steep sites, this compaction might be a problem.

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Table 1. Pine seedling growth and survival in the kudzu demonstration area.

	-----1991-----				-----1991-----					
	July	August	Sept	Oct	April	May	June	July	August	Sept
Height	10.7	13.6	12.4	10.8	15.0	19.9	18.2	22.2	20.3	19.1
Crown Spread	6.3	7.4	6.9	5.5	6.0	9.5	10.7	10.2	9.8	8.7
Stem Diameter	--	.17	.18	.19	.23	.26	.28	.32	.35	.32
Crown Class	2.4	2.2	1.9	1.9	2.2	2.6	2.6	2.0	1.4	1.7
Vigor Class	2.5	2.9	2.2	1..6	2.7	3.2	2.9	2.0	1.6	1.9
Survival	89.9%	79.7%	72.5%	53.7%	37.0%	28.8%	28.0%	26.9%	19.9%	19.9%