

BIOLOGICAL VEGETATION CONTROL USING GOATS

By

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Livestock can be used effectively to control forbs and woody vegetation when the following conditions are met:

1. The target species are known to be preferred, consumed, or tolerated by the animals.
2. Plants that are known to be toxic are not present, or remedial action is taken to reduce toxicity.
3. The vegetation height does not exceed the maximum browsing height of the animals (up to 6' for does and 8' for bucks and cattle), or vegetation is reduced to browsing height, or trees girdled.
4. Preferred alternative forage or browse is not available to animals, or is calculated in forage animal balance.
5. Animal demand for the vegetation exceeds the plants' regrowth rate.
6. Animals are allowed to completely defoliate the target plants.
7. High-density impact is used to trample undesirable species not selected.
8. Monitor body condition of livestock, removing livestock and replacing with more as needed to maintain healthy animals. On a scale of 1 to 9 no more than 20% of the animals should be rated as a BCS 4, the other livestock should have a BCS of 5 or better.

Mechanical treatment is used as needed to improve animal access. Livestock may be used as a follow-up after mechanical treatment, prescribed burning, or for initial treatment of low-growing woody vegetation. As a general rule, woody vegetation taller than 6' is not accessible to livestock, but they will sometimes girdle trees and trample species not grazed.

Timing of defoliation has a significant effect on the success of this treatment. Goal is depleting carbohydrate reserves and photosynthetic area of target species. Be aware that undesirable weed seed can pass through livestock and the rate of passage is typically 24 hrs so plan on holding animals off of clean land till seed have had an opportunity to pass.

Size of the treatment area will impact the level of defoliation. If the area is too large, the plants will not receive sufficient stress for plant mortality to occur. The size of the area must be small enough to concentrate the livestock for optimum success. Stock density of 10,000 lbs./ac. is a good starting point (i.e. 100/100 lb. goats on one acre or 25/100 lb. goats on ¼ acre). Prescribed stock density will depend on palatability of species being targeted and season of use. Always consider erosion and impact on sensitive areas, some areas may need to be managed differently to protect resources.

Animals must be observed daily to ensure that animal welfare is not jeopardized. Inspections must ensure that animals have access to sufficient amounts of feed and water. Poisoning in animals occurs primarily when hungry animals are turned into a toxic weed-infested area where better forage is absent. The site should be inspected prior to the introduction of animals to ensure that toxic or poisonous plants are not the only forage present. Physical removal of any toxic plants is encouraged, or remedial action taken. Supplemental nutrients should be provided to maintain Body Condition Score (BCS) of 4, moderate condition, or higher.

Consider multi-species grazing.

The following methods will be used to control woody vegetation with goats:

Priority Pastures

- 1. Conduct Initial Inventory of Vegetation Present** – Determine forage species, quantity, animal preference, and objective. Consider all vegetation within browsing height woody, forb and grass.
- 2. Select Priority Pastures** – Grazing prescription will target priority areas.
- 3. Stock with Animals** – Sufficient animals will be needed to maintain 85 percent or more defoliation. Livestock will be placed in the first priority pasture at the rate they are needed and as often as necessary to maintain at least 85 percent defoliation (adjust stocking rates as needed). Monitor erosion potential, one option if erosion is a threat is to unroll hay which has seed of a desired species in it. Livestock will trample in mulch and seed as well as fertilize seeding with manure.
- 4. Chemical spot treatment may be needed to treat emergence after prescribed grazing treatment.** If chemical treatment is used follow label and adhere to grazing restrictions.

Table 1 - Browse preferences of goats

Target Species	Goat Diet Preference	Toxic Plant	Notes
Oak spp. (<i>Quercus spp.</i>)	Consumed	Yes	Depending on growth form, oaks, winged elm, and yaupons were generally selected in proportion to their availability (Lopes & Stuth, 1984). Some literature indicates that toxicosis may occur when Oak or other high tannin vegetation comprises a major portion of the animal's diet.
Persimmon (<i>Diospyros virginiana</i>)	Consumed	Yes	Persimmon fruits contain water-soluble tannins, which precipitate in the acidity of the stomach to form a sticky coagulum of fruit skin, pulp, seeds, and gastric protein that becomes a solid mass or phytobezoar. Once formed, the phytobezoar is abrasive and can lead to ulcers and even rupture of the stomach of horses that have eaten large quantities of ripe persimmon fruits. Severe colic results when impaction of the stomach occurs.
Mockernut hickory (<i>Carya alba</i>)	Low	No	USDA PLANTS database.
Saw greenbrier (<i>Smilax bona-nox</i>)	High	No	USDA PLANTS database.
Loblolly pine (<i>Pinus taeda</i>)	Low	No	USDA PLANTS database.
Blackberry (<i>Rubus spp.</i>)	High	No	USDA PLANTS database.
American beautyberry (<i>Callicarpa americana</i>)	Medium	No	USDA PLANTS database.
Dogwood (<i>Cornus florida</i>)	Low	No	USDA PLANTS database.
Maple spp. (<i>Acer spp.</i>)	Low	No	USDA PLANTS database.
Buttonbush (<i>Cephalanthus occidentalis</i>)	Low	No	USDA PLANTS database.
Cypress	Low	No	USDA PLANTS database.
Kudzu (<i>Pueraria montana</i>)	Preferred	No	Infestations of Kudzu have been successfully controlled with prescribed grazing by sheep and goats.

Target Species	Goat Diet Preference	Toxic Plant	Notes
Mimosa (Silk tree) <i>(Albizia julibrissin)</i>	Low	No	Mimosa was considered a low preference tree by goats in this trial (score of 3-4). Goats would only taste the leaves and then move on to one of the other species. Nevertheless, it is possible goats would readily consume Mimosa and perform satisfactorily when it is the only option for browsing. (Addelstone, et al, 1999).
Castor bean (<i>Ricinus communis</i>)	Consumed	Yes	All parts of the plants are toxic, but most dangerous are the seeds. The most susceptible animal species include cattle, horses, sheep, pigs, fowl, rabbits, and other small animals. Seeds ingested at 0.2 percent of body weight have caused toxicosis in cattle and 0.01 percent of body weight was toxic to horses http://www.library.uiuc.edu/vex/toxic/castor/castor2.htm . Plant parts of castor beans and rosary peas, other than the seeds, are rarely reported as a cause for poisoning in animals. Although the leaves of the castor bean plant are rarely eaten, they are reported to be toxic. Cattle fed castor bean leaves develop signs distinct from those associated with ricin. Affected animals develop neuromuscular impairment characterized by muscle weakness, tremors, salivation, and excessive eructation. Recovery may occur after a short period or the animal dies, presumably as a result of the quantity of leaves consumed. (Tokarnia CH, Dobereiner J, Canella CFC. Experimental poisoning by the leaves of <i>Ricinus communis</i> in cattle. Pesq Agropec Bras Ser Vet, 1975; 10:1-7.)
Buck brush	High	No	Resilient to grazing
Sumac	High	No	Sensitive to overgrazing
Thistle	Medium	No	Season of preference heading
Kudzu	High	No	Due to site kudzu was typically planted on manager needs to be particularly aware of erosion potential. Cattle may be preferred livestock for target grazing kudzu, depending on terrain. Goats and sheep can be used as well.
Multiflora Rose	High	No	Sensitive to overgrazing
Cedar	Medium	No	Cedar do not sprout when defoliated
Honeysuckle	High	No	Winter forage
Honey locust	Medium	No	Legume, Thorns can cause some abscess's
Wild Cherry	High	High	Toxic when leaves are wilted. Goats will girdle trees toxicity of bark unknown
Curley dock	High	No	Preference when seeding
Burdock	Medium	No	Preference when seeding
Privet	High	No	Winter forage
Lambsquarter	High	No	
Common ragweed	High	No	
Giant ragweed	Medium	No	
Wingstem weed	Low	No	Cattle graze better than goats and sheep
Spiny Amaranth	Medium	No	
Perilla Mint	Low	High	Not consumed