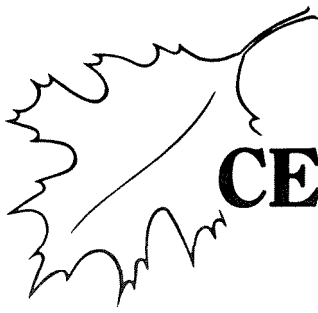




CENTRAL HARDWOOD NOTES

Grazing In Central Hardwood Forests

Woodland grazing is a major forestry and land management problem in parts of the central hardwood region. Most forest grazing is by cattle and, to a lesser extent, hogs in woodlands adjacent to pastures or feedlots. The practice is particularly common in the cattle producing areas of the Corn Belt where often 50 percent or more of the upland forest is grazed. Woodland grazing has minor benefits for livestock but exposes them to poisonous plants, and causes extensive and long-lasting damage to the forest. Livestock benefits are primarily shade, forage, and protection from wind in winter, while the damages to the forest are numerous. For additional information, see Note 11.04 *Grazing Effects on Soil and Water*.

Tree Seedlings and Saplings

Livestock browse and trample seedlings, and push over small saplings to obtain the foliage. This leads to reduced stocking and productivity of present stands, and changes species composition and lowers production and values of future stands. Livestock browsing is very selective, and depends on species palatability. Unfortunately, many of the palatable trees include the more valuable yellow-poplar, white ash, northern red oak, and white oak. Black walnut is a notable exception. The tabulation on the following page shows the preferences by cattle for under-story shrubs and trees.



A grazed hardwood stand. Note the low stocking and poor quality of the overstory trees and the absence of litter, shrubs, seedlings, and saplings. (Harold Scholten)



Note seedling and sapling reproduction on the right side of the fence where grazing has been eliminated. (Harold Scholten)

**Readily browsed
under light
grazing**

Yellow-poplar
White ash
Sugar maple
Red maple
American basswood
Northern red oak
White oak
American elm
Red elm
Blackgum
Redbud

**Browsed under
moderate
grazing**

Black oak
Scarlet oak
Bur oak
Pignut hickory
Bitternut
hickory
Shellbark
hickory
American beech
Black locust
Black cherry
Sassafras
American sycamore

**Browsed only
under heavy
grazing**

Shagbark hickory
Dogwood
Black walnut
Honeylocust

**Rarely browsed,
even under
heavy grazing**

American hornbeam
Eastern hophornbeam
Common persimmon
Pawpaw
Eastern redcedar
Osage-orange
Hawthorns
Devils-walkingstick
Gooseberry
Multiflora rose
Blackberry
Buckbrush

Long-term grazing means that the forest understory and eventually also the overstory will consist primarily of the less palatable species on the right side of this tabulation, and will contain few or none of the species on the left side.

Forest Productivity and Value

Grazing lowers forest productivity and value by (1) reducing individual tree growth, (2) reducing stand stocking and growth, (3) changing the species composition, (4) reducing wood quality, and (5) reducing sugar maple sap and syrup yields.

Livestock trampling compacts the surface soil and damages the fine absorbing tree roots. This reduces the tree's capability to absorb water and nutrients and leads to moisture stress, crown dieback, reduced growth, loss of vigor, and increased susceptibility to insects and diseases. Heavy grazing can reduce sapling diameter growth 25 to 50 percent. Stocking and growth of grazed stands gradually decrease as overstory trees die but are not replaced because seedlings and saplings are scarce. Species composition changes because the few seedlings and saplings that survive are primarily the less palatable species such as shag-bark hickory, eastern hophornbeam, or honeylocust, rather than the oaks, ashes, elms, or maples normally found in the understories of ungrazed stands. Wood quality is also reduced by grazing. Decay organisms enter the trees through wounds to roots or lower boles caused by trampling, rubbing, or bark stripping. The wood of trees in grazed stands may contain dark stains that preclude their use for high quality lumber or veneer. Sugar maple sap and syrup yields are reduced 25 to 50 percent by grazing.



This grazed stand is so open that a grass sod has become established. (Harold Scholten)

Wildlife Habitat Many wildlife species utilize woodlands for food, cover, burrows, dens, or nest sites. The destruction of essential habitat features greatly reduces the number and kinds of wildlife that can live in a grazed forest. One study in Ohio showed that the mammal and bird populations respectively were 40 and 75 percent less in a grazed forest compared to an adjacent ungrazed forest.

Esthetic and Recreational Values The presence of livestock and the changes caused by grazing may dramatically reduce the esthetic and recreational values of forests for most people. Grazing reduces wildlife populations, eliminates many woodland flowering plants and shrubs, and causes streambank erosion, reduces water quality, and destroys desirable aquatic habitats.

Poisonous Plants Central hardwood woodlands contain more than 100 woody and herbaceous plants poisonous to livestock. Fortunately, most of these plants are unpalatable and are not eaten by livestock when enough suitable forage or feed is available. Some important poisonous plants of central hardwood forests are:

- | | |
|----------------------|----------------|
| White snakeroot | Dwarf larkspur |
| Dutchman's breeches | Bracken fern |
| Squirrelcorn | Oaks |
| Poison-hemlock | Black cherry |
| Spotted waterhemlock | Black locust |
| Ohio buckeye | |

White snakeroot is a very common and highly toxic woodland plant that can cause a potentially fatal livestock condition known as "trembles." Drinking milk from affected cows can cause the potentially fatal "milk sickness" in calves and humans. Dutchman's breeches, squirrelcorn, and dwarf larkspur are all also known as "staggerweed" because of their effect on livestock, particularly cattle. Dwarf larkspur is especially dangerous because it is readily eaten by livestock. Spotted waterhemlock has been called the most dangerous poisonous plant in the United States because it is abundant and extremely toxic.

The leaves, young shoots, and buds of oaks are poisonous to livestock in large quantities, and acorns (especially unripe acorns) are toxic to cattle. Black cherry leaves contain a harmless glucoside which rapidly converts to hydrogen cyanide when they wilt or are bruised. The leaves, pods, and seeds of black locust are poisonous, as are the leaves, buds, bark, and seeds of Ohio buckeye.

Benefits of Grazing The benefits of woodland grazing are primarily shade, forage, and protection from winter wind. Shade reduces heat stress in livestock, and is especially beneficial in hot weather to cattle with elevated body temperatures associated with fescue poisoning.

Forage in grazed woodlands consists primarily of the grasses and sedges in open forests. Forage production in grazed woodlands ranges from less than 30 to more than 300 pounds dry weight per acre per year. In contrast, improved pastures in the Midwest produce from 3,000 to 10,000 pounds per acre per year. Woodland forage is also significantly poorer in protein, sugar, and digestible carbohydrate content than forage grown in open pastures.

In Summary

The best management for both livestock and the forest is to keep the two separate. If shade or winter protection are an important consideration when fencing between a pasture and a forest, leave small areas of trees in the pasture while protecting most of the forest. The increased income from a properly managed, ungrazed forest will usually more than offset the fencing cost and, in the long run, livestock, trees, wildlife, landowners, and their families, friends, and neighbors will all benefit from keeping livestock out of the forests.

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