

SOME EFFECTS OF LIVESTOCK GRAZING
ON CONIFEROUS TIMBER REPRODUCTION

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INTRODUCTION

The forest lands of the United States furnish seasonal and year round grazing for millions of livestock. Under proper management most of the forest range can be grazed profitably and in harmony with other uses, but when grazing is unregulated it destroys the forage and seriously impairs other forest values. This paper presents some of the effects of grazing on coniferous timber reproduction. The species covered are: Douglas-fir, ponderosa pine, western white pine, longleaf pine, and loblolly pine, which occur on forest land where grazing is commonly practiced.

The effects of grazing on timber reproduction are very important to the nation's future timber production as more than half of the forest land in the United States--about 350 million acres--is used for range (21).

DOUGLAS-FIRBenefits from Livestock Grazing

Fire is the greatest hazard to timber reproduction (6) and the removal of vegetation by livestock greatly reduces the fire hazard (6, 9, 10, 18). Goats will usually eliminate brush even after it has been established (5, 6). This brush removal greatly aids seedling and grass establishment, besides helping to reduce the fire hazard. Trampling and establishment of trails are important factors in reducing the fire hazard (6, 9, 10, 18).

Trampling by stock aids seedling establishment and better survival occurs on grazed than on ungrazed areas (6, 9, 10, 18). Trampling of the seeds into the ground, incidental scarification of the seeds, and the exposure of mineral earth for good seedbed conditions are beneficial to seedling establishment (6).

Damage from Livestock Grazing

Under moderate grazing the damage to seedlings is generally very light, but overgrazing results in serious damage to young trees and seedlings (6, 9, 10, 18).

Under most conditions, damage to seedlings is greater from trampling than from nipping except where livestock bed down or where palatable vegetation is scarce (9).

Cattle browse seedlings and saplings occasionally; sheep and goats more destructively (6, 18), goats being the most destructive (6).

Goats, and sheep to a much less extent, nip off fir seedlings and new buds on young firs, but not to a great degree unless the area is overstocked. Sheep have been observed eating fir seedlings and other tender fir buds and shoots during the early spring when other green feed was scarce (6). ? ✓

All types of grazing livestock will eat fir buds and tender shoots and nip off small seedlings at certain times of the year, or under certain conditions, to the extent of causing permanent injury or death to small trees and seedlings (6). Rubbing (6, 18) and trampling by livestock damage a small number of young trees and seedlings (6).

"Much of the nipping damage occurs during the winter when the ground is covered with snow or in the early spring when the new growth is tender and the livestock are hungry for green forage. Trees above four feet in height are seldom damaged (6)."

In areas where Douglas-fir grows mixed with ponderosa pine, sugar pine, and white fir, sheep prefer the reproduction of the other species to Douglas-fir reproduction (18).

PONDEROSA PINEBenefits from Livestock Grazing

Moderate cattle and sheep grazing on logged ponderosa pine lands is compatible with timber growing and fire control in Oregon and Washington (10, 12).

Grazing in the Southwest reduces the fire hazard by removing inflammable vegetation (13).

One of the greatest benefits of livestock pasturing to the establishment of a stand of forest trees is the reduction of competing plants. In an experiment in Central Washington it was reported that the high density of herbaceous understory vegetation on an ungrazed area contributed to a deficiency of advanced tree reproduction. Heavy grazing of the herbaceous understory appeared to be the main reason for the dense advance tree reproduction on a similar area which had been grazed (16).

Damage from Livestock Grazing

As early as 1898, it was reported that there was little injury to ponderosa pine seedlings except along trails and on bedgrounds (4).

In the mixed Douglas-fir--ponderosa pine forests of Central Idaho, it was determined that moderate grazing caused but slight damage to seedlings after they reached three years of age. Early season grazing was most destructive. Ponderosa pine reproduction ranked first in injury, lodgepole pine second, and Douglas-fir last (20).

In the Southwest the aridity and frequent droughts cause heavy mortality among young pine seedlings, and good seed crop years are rare. This calls for special land use practices to favor seedling establishment (17).

Ponderosa pine reproduction must be protected from over-grazing by sheep throughout the Southwest when the seedlings are young (15). Reproduction suffers little injury under conservative grazing and good grazing management (8, 15).

In the Southwest, during the dry summer months, damage by sheep occurs where palatable browse and forbs are inadequate. By autumn the tree seedlings are not so attractive to stock, as the leaves and stems are more fibrous and resinous (13).

It has often been found that browsed off shoots of ponderosa pine were replaced within a season (3, 14).

During the first and second years after germination, seedlings may be killed outright by grazing, because the entire crown is eaten and no buds are left. Where reproduction is wanted, grazing must be light until the seedlings are at least three years old (17).

WESTERN WHITE PINE

Moderate grazing by sheep is beneficial to white pine reproduction in northern Idaho. Overgrazing and excessive trampling contribute to a large loss of Douglas-fir seedlings. The loss of all types of coniferous seedlings due to sheep trampling was greatest in the one year class and decreased to practically no loss at five years of age (22).

Trampling enhances white pine seed germination by seed contact with mineral soil and possible seed stratification (22).

Grazing forest lands immediately after logging operations helps control forest vegetation which would otherwise be competing with conifer reproduction (22). Continuous overgrazing is harmful to coniferous reproduction (22).

LONG LEAF PINE

Cattle grazing in the pine forest is seldom injurious to reproduction. The most critical period is winter and early spring before forage growth becomes abundant. At this time the buds of longleaf pine are likely to be damaged by browsing. At other seasons cattle may be more beneficial than harmful to pine reproduction (1, 19).

In Mississippi, sheep have been reported to have eaten the terminal buds of longleaf pine. It appeared that the sheep ate the pine buds because they were hungry rather than because of something lacking in their diet. Most of the nipping occurred during the late winter and early spring months. Trees over four feet high suffered no apparent damage, but the buds were nipped on eighty-six per cent of the seedlings and smaller trees. Four years after the sheep were removed, a resurvey showed that fifteen per cent of the seedlings were too badly deformed or stunted to produce high quality timber. This occurred on a 1300 acre pasture which was stocked at the rate of one sheep to twelve acres (11).

LOBLOLLY PINE

In Arkansas, winter and spring cattle grazing is destructive to loblolly pine reproduction after a seedfall (7).

In Louisiana, the damage to loblolly pine trees by cattle is highly attributable to overpasturing. Cattle have been observed pulling needles and nipping the buds of young pines under closely grazed conditions. Most of the damage to young seedlings occurred in the early spring from physical injury to the tender shoots (2).

The fire hazard is considerably reduced through grazing by the removal of highly inflammable grass material (2).

THE MOST INFLUENTIAL FACTORS
CAUSING DAMAGE TO TIMBER REPRODUCTION ON THE RANGE

Character of Forage

Where forage is limited or unsuited to the animals grazed, timber that can be browsed throughout their height are subject to serious injury, especially by sheep, goats and deer. (17).

Season of Grazing

Livestock grazing is least injurious to timber reproduction when the forage is tender and reasonably abundant. Young tree seedlings may be seriously trampled by stock early in the spring when the soil is wet and the herbage limited. (17).

Degree of Utilization

The extent of damage to timber reproduction increases approximately in proportion to the closeness of the grazing.

Many small seedlings are destroyed by trampling, but goats and sheep that browse seedlings during their first year's growth on closely used range cause even greater damage.(17).

Grazing Management Practices

Poor distribution of cattle due to incorrect spacing of water and salt grounds, improper handling, and lack of adequate drift and division fences also account for injury to reproduction.(17).

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SUMMARY

The most important single conclusion is that moderate grazing causes very little damage to timber reproduction, under ordinary circumstances.

The prime factors causing damage to timber reproduction are: the character and abundance of available forage and the kind of livestock grazed on the forage; the season of grazing; the degree of utilization; and the grazing management practices. The actual damage to seedlings and young reproduction comes from nipping, trampling, rubbing, and soil compaction.

The greatest benefit to the forest from grazing is the reduced fire hazard through removal of inflammable vegetation.

Seedling establishment is aided by vegetation removal and by trampling, which tends to provide a mineral soil seedbed, and by seed scarification and stratification.

GENERAL RECOMMENDATIONS

During the late winter and early spring or when the ground is covered with snow, all livestock should be kept out of areas where seedlings and small trees occur. This rule should be particularly observed where the trees are under three years in age or four feet in height.

Indirectly, tree reproduction and forage growth are protected by using good pasture or supplemental feed to maintain healthy livestock under adverse range forage conditions.

After seeds germinate, the livestock should be excluded for at least two or three years for best results in seedling establishment.

Graze the kind of livestock that will best utilize the available forage to minimize the nipping of seedlings and small trees.

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