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# Current Report

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## EASTERN REDCEDAR UPDATE - 1989

**Terry Bidwell**  
Extension Range  
Management Specialist

**Jim Stritzke**  
Extension Weed  
and Brush Control Specialist

**Dave Engle**  
Professor, Range Management

Department of Agronomy

### History of Eastern Redcedar

Fire historically prevented eastern redcedar encroachment into grasslands and forest meadows of Oklahoma. With the reduced incidence of fire in the last 100 years, eastern redcedar has become a prominent component of rangelands in Oklahoma. In 1950 eastern redcedar was considered a problem on almost 1.5 million acres of Oklahoma rangeland and by 1985, this had increased to over 3.5 million acres. Three main areas of eastern redcedar distribution have been identified. Two of these areas are located along the slopes adjacent to major river drainages in the northwestern and central-north central part of the state. The third area, in some cases mixed with Ashe juniper, is in the south central part of the state around the Arbuckle Mountains and in scattered pockets throughout southeastern Oklahoma.

The visible increase of eastern redcedar in pastures which were recently free of eastern redcedar has many ranchers and landowners concerned with declining forage production and livestock carrying capacity. Studies were initiated in 1984 to determine the growth rate of trees and the effects of trees on forage production.

### Growth Rate of Trees

Eastern redcedar trees growing on a shallow prairie range site in McIntosh County were sampled in the summer of 1988. The number of annual growth rings of 41 trees were determined from slices of main stem taken 1 inch from the soil surface, and tree height and diameter were measured. For trees of age 6 through 28 years, height increased about 1 ft per year. Diameter growth rate was predicted best by the square of tree age, indicating that diameter growth progresses more rapidly as trees age.

### Effects of Cedars on Forage Production

Forage production was measured around individual eastern redcedar trees in Payne County. There was some reduction of forage production beyond the dripline of eastern redcedar trees, but the major reduction of forage was beneath the tree crown. This reduction under the tree was similar for trees of all sizes. A tree with a 6 foot diameter tree crown will reduce forage production on shallow prairie range sites by about 6 lbs. Shallow prairie range sites in central Oklahoma produce about 3000 lbs./acre of forage in a favorable year, so 250 trees/acre would reduce forage production by 50 percent.

## Burning Prescriptions for Control

Prescribed fire is the most economical way to control eastern redcedars. With trees less than five feet tall, more than 85% of the trees can be controlled with fire if 4000 lbs./acre fine fuel is available in April. With other environmental variables being equal, fine fuel loading is the main influence on cedar kill. For example, when fine fuel (herbaceous plant material) loading is only 2000 lbs./acre, less than 60% of trees 5 feet tall will be killed. Even distribution and uniformity of the fuel throughout the pasture also greatly enhances cedar kill. The general fire prescription for spring burning is as follows:

Air Temperature	(60-80° F)
Relative Humidity	(30-50%)
Wind Speed	(5-10 mph)
Fine Fuel Loading	(2000 lbs./acre +)
Soil Moisture	(top 6 inches is moist)

For optimum redcedar control, the fire should be conducted 'on the hot side of the prescription' but still within the prescription boundaries. For example, a good 'hot' burn would result with a 10 mph wind, 30% humidity, 75° F temperature, and 4000 lbs./acre or more of fine fuel.

## Post-Burning-A Way to Kill Large Trees

A portion of the lower part of large trees are often scorched from prescription burning. We have found that these large trees can be burned if the lower scorched part is reignited after it turns brown. Based on our observations of trees with different amounts of browned-out leaves and under different environmental conditions, tree kill will average between 60 and 70% when trees are reignited in late spring and summer (air temperature above 55 F and wind speed less than 10 mph). Trees 8 to 16 feet tall burned as effectively as smaller trees under these conditions. Tree kill under cooler winter conditions (less than 55 F) was not very effective (less than 50% tree kill). It would appear that post-burning large trees is an excellent way to kill large trees not controlled by the initial prescribed burn.

## Chaining for Control

Much of the state's rangeland has eastern redcedar trees that are too large and with inadequate fine fuel for adequate control with a prescribed fire. Chaining is an alternative to dozing, grubbing, sawing, or cutting large redcedar trees. Chaining is accomplished by dragging heavy anchor chain in a U-shaped, half circle, or J-shape behind two dozers traveling in a parallel direction. Chains with links weighing more than 70 pounds stay on the ground better and are more effective on young flexible trees. The chain must be dragged at a speed to maintain maximum ground contact. The narrow U-shape provides better pull-up of small trees and gives more windrowing effect. The half-circle shape increases swath width, but decreases effectiveness in the center section. The chain length to swath width ratio of 2:1 to 3:1 is recommended. For example, when a 300-foot chain is used, a swath of 100 to 175 feet in width is common and generally gives good control. Higher traveling speed also gives more whip action and higher kill. A follow-up prescribed fire is recommended to reduce the debris on the area after chaining. Burning dead cedar requires extreme caution because dead cedar is a volatile fuel which can create spot fires several hundred yards away.

Chaining and individual tree dozing were conducted on the McCarty Ranch in Pittsburg County. On 530 acres, trees were chained during the fall of 1987 using two D6 dozers at a cost of \$16/acre. This was followed with an April 1988 prescribed burn at an estimated cost of \$2.50/acre. Native grasses have regained dominance on the site and another prescribed April burning is needed to burn dead tree debris, to kill remaining trees, and to improve forage quality. On 48 acres, individual trees were dozed with a D5 and D6 dozer, piled, and burned at a cost of \$97/acre. In addition, the land was prepared for planting an introduced grass at a cost of \$26/acre. Total cost on 48 acres to remove redcedar by individual dozing and conversion to an introduced grass totaled \$123/acre.

### Update on Chemical Control

Grazon PC and Velpar are currently labeled for cedar control. Results continue to be variable with both hexazinone (Velpar) and picloram (Grazon 10K and Grazon PC). Control with both herbicides has varied from fair to excellent depending on rainfall after application. Grazon 10K is no longer available, so Grazon PC, applied as a spot treatment, is the current formulation of picloram to use. At comparable rates, Grazon PC usually was more effective than the Grazon 10K formulation.

The rate of both of these herbicides is dependent on the size of the tree, measured as either diameter or tree height. For practical purposes, trees 3 feet in height have a 1 inch stem diameter. Current recommendations are to use 2 cc of either herbicide per 3 ft. of tree height.

It is obvious from past results that both herbicides can give good tree kill of eastern redcedar with correct rainfall after application. However, too little or too much rainfall will

significantly decrease effectiveness. We currently are favoring May and early June applications, and if possible, applying on dry soil just preceding a 1 or 2 inch rain.

Chemical cost of treating a 3 ft. tree (1 inch stem diameter) with 2 cc of product would be about 3 cents for either Velpar or Grazon PC. Tree kill of small trees (less 6 ft.) with both herbicides has been consistent enough and the cost is low enough to consider chemical control of small trees as an effective treatment option.

### Grazing Management After Treatment

Proper grazing management must be followed after any fire, herbicide, or mechanical brush control practice to insure that the grass stand is both maintained and improved. If only part of a pasture is treated, livestock will concentrate there and overgraze the area. Therefore, the entire pasture should be burned to even-up grazing distribution. Stocking rate should also be adjusted to reflect how much forage is available for livestock to graze.

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