

# Redberry Juniper Response to Top Removal

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**Highlight:** *Redberry juniper* (*Juniperus pinchoti*) sprouted vigorously from root crowns after removal of tops by cutting. Regrowth was least on trees cut from June through August, indicating that this is the optimum period for control by top removal. Production of sprouts was directly proportional to tree size.

Knowledge of the regrowth characteristics of noxious brush species such as redberry juniper (*Juniperus*

*pinchoti*) is necessary to plan retreatment after initial control. Knowing the relation of regrowth to season of cutting or plant phenological stage facilitates planning the time of application of control treatments.

The objectives of this study were to relate redberry juniper regrowth to season of cutting, size of main stem, plant moisture and phenological conditions.

## Locations and Procedures

The study area was located in Garza County, Tex., along the escarpment of the Llano Estacado in the southern portion of the Texas High Plains. Potter and Mansker are the predominant soil series along the upper edge of the escarpment. Redberry juniper invasion of deeper soils of the high

plains from the rocky slopes of the escarpment is believed to be due to fire suppression and overgrazing (Ellis and Schuster, 1968). The herbaceous vegetation of the study site was typical of deep hardland sites in the southern high plains, with blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*) being the most abundant species.

Forty redberry juniper trees were chosen to represent five size classes based upon the circumference at the main stem. Size classes were < 8, 8-15, 15-23, 23-30, and > 30 cm. Beginning in January, two trees in each size class were sawed off at ground level at monthly intervals throughout the year. Data from supplementary mid-month cuts from April to October were incorporated into monthly values.

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One year from the date of cutting, the regrowth from each stump was clipped and oven-dried at 70°C for 72 hours for determination of moisture content and dry weight production. Analyses of covariance were used to test differences in regrowth in relation to tree basal circumference and date of top removal.

The phenological development of uncut redberry juniper trees at the study site was recorded at biweekly intervals during both the year of top removal and the year of regrowth clipping. Criteria for phenological stages is similar to that used by Herman (1956).

## Results and Discussion

Seventeen percent of the junipers had not resprouted 1 year after top removal, with no differences among size classes. The remaining 83% produced varying amounts of regrowth depending upon their size and season of top removal. The average production of regrowth was lowest for the June cutting and highest for the December cutting. Mean separations using orthogonal comparisons showed that regrowth on December-cut trees was significantly greater (0.05 level) than all other months. No other significant differences among months was found. Orthogonal comparisons indicated that trees cut during the 6-month period of April through September had significantly less sprout regrowth than trees cut during any other 6-month period. This period is associated with the phenological stages of staminate flower opening in the spring to the time bark begins to stick in the fall. Trees cut from May through August in this period had less regrowth than all other combinations of months (significant at 0.01 level). Jameson and Johnsen (1964) found that alligator juniper (*J. deppeana*) cut in October and June produced fewer sprouts than trees cut in August, January, or April.

Herman (1953) reported inconsistent regrowth from stumps of different size in Utah juniper (*J. osteosperma*), but we found a positive

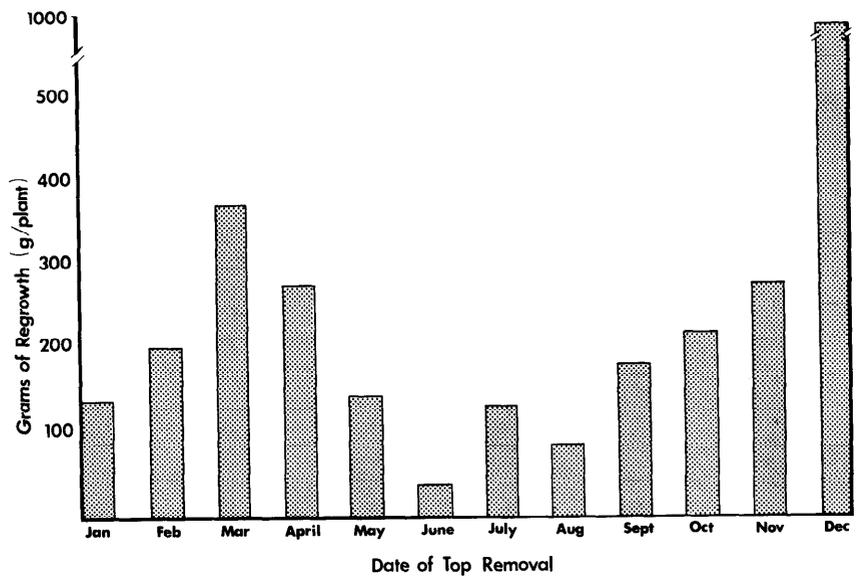


Fig. 1. Average oven-dry regrowth (g/plant) of redberry juniper collected at monthly intervals 1 year after top removal (corrected for main stem circumference by covariance).

linear relationship between regrowth production and basal stem circumference. The smallest amount of regrowth occurred in the smallest size class of plants, and regrowth production increased in relation to tree size. The positive correlation between basal circumference of the tree and regrowth production ( $r = .996$ ) substantiated field observations that dormant buds increase in number with the size and age of the tree. It also indicates that in redberry juniper control operations, stands with larger trees at initial cutting will need retreatment earlier than stands with smaller trees.

Apparently sprouting vigor is related to tree size and associated factors such as assimilation of photosynthates and carbohydrate storage in the roots. Moisture content of the regrowth is apparently affected by soil moisture and growth stage, however. Juniper sprouting after cutting was not highly correlated with cumulative precipitation from Post, Tex., 7 km north of the study area. However, the moisture content of the sprouts generally followed closely the amount of precipitation recorded for the month preceding clipping of the regrowth. As

expected, moisture content of the sprouts was lowest during the dormant season (November–March) and highest during the growing season. Rainfall from April through October averaged 150% greater than the long-term average. Reynolds (1967) also observed that moisture content of sprouts of three chaparral species responded to rainfall during the growing season.

Based on our data, redberry juniper sprouts least after top removal during the summer months or after stem elongation starts in the spring and before the bark sticks in the fall. These findings should apply to all types of control which depend upon mechanical removal of the aboveground parts of this sprouting species. Top removal of redberry juniper during a critical growth period may increase the effective life of the treatment. Therefore, control measures such as axing, sawing, roller chopping, or shredding should be planned for the summer growing season for best results.

## Literature Cited

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Table 1. Phenological stages of redberry juniper as observed at biweekly intervals throughout 1968 and 1969 in Garza County, Tex.

Stage	Dates of occurrence
Bark begins to slip	March 15 to April 1
Staminate and pistillate flowers open	April 1 to 15 and October 1 to 15
Start of leader elongation	April 15 to May 1
Bark begins to stick	September 15 to October 15
Leader elongation stops	October 15 to November 15
Dormant period	November 15 to March 15