STUDIES ON GAMBEL'S OAK
AT THE
SAN JUAN BASIN STATION
San Juan Basin Branch Station Hesperus, Colorado
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Research to develop methods of controlling Gambel's oak was started in 1962 at the San Juan Basin Branch Station. Objectives of this study were to evaluate various chemical methods of oakbrush control, the effects on the understory vegetation and possible increases in forage production. The final goal is to improve oakbrush rangeland for better livestock management.

Primary emphasis for oakbrush control has been placed on the use of herbicides. Grazing studies are being conducted to compare animal gains and forage production on pastures treated to control oakbrush and native oakbrush range. Soil moisture comparisons between controlled and non-controlled oakbrush plots are being made to provide another measure of benefits from brush removal practices.

HERBICIDE STUDIES

Gambel’s oak has been effectively controlled with “brush killer” type herbicides at the San Juan Basin Branch Station, but the results over six years of research have not been consistent. Three successive treatments with 2,4,5-TP ester at the 2 pound rate (a.e./acre) will provide good crown kill, but abundant root sprouting results. Repeated treatments of 2,4,5-T, 2,4,5-TP and 2,4-DP at 2 and 3 pound rates has opened up the brush for increased grazing. Additional studies including mixtures of these herbicides and Tordon indicate considerable promise in the control of Gambel’s oak. Tordon and

CARBOHYDRATE ANALYSIS
OF GAMBEL OAK ROOTS

Samples of Gambel’s oak roots were collected at two week intervals during the summers of 1966 through 1968. Total available carbohydrate analysis was made on the root samples to determine the level of carbohydrates in the storage tissues during the growing season.

Results of the carbohydrate analysis indicate a low storage period during the last part of June and early July (Figure 1). The low storage periods for individual years are the first week in July for samples collected in 1966 and 1968 and about June 20th for 1967. These low storage periods compare readily with the full leaf stage for each of the three years. Another period of low carbohydrate storage appears during late August. Although the August data represent only two years of information (broken line on graph), it is possible that this drop in storage level may be brought on by regrowth following the beginning of summer rains after the spring drought (especially 1967).

Herbicide treatments should not be applied to Gambel’s oak prior to June 20 or the full leaf stage according to these data. Best results for better movement of herbicides to the roots would be with applications when the carbohydrate storage in the roots is increasing rapidly as indicated during the month of July.
SOIL MOISTURE STUDIES

Controlling Gambel's oak will provide more soil moisture for undergrowth forage. Studies in 1967 and 1968 at the Hesperus Station have indicated a significant increase in the soil moisture during the summer growing season where oak was controlled. The greatest response is at the three- to five-foot depths, a zone including numerous oak roots. This response of increased soil moisture is not evident in areas where the oak crown has been killed and sprouting has occurred (Figures 2-6). The significant increases in soil moisture where Gambel's oak was controlled indicates the potentials of these oak rangelands for more forage production as well as watershed benefits.

Both pastures have been grazed by yearling steers during the same grazing period for the past three years. When the forage in both was used to about 50 percent the pasture with brush control produced approximately 80 percent more forage and carried nearly twice as many animals for the same grazing period. The average gain per acre for the past three years has been 28 pounds for the non-treated pasture and 43 pounds for the brush-treated pasture. Daily gain per steer has been over 2.0 pounds or greater the past two years on both pastures.

GRAZING STUDIES

Three years of grazing studies have been conducted on paired oakbrush pastures, one unit untreated and the other treated with herbicides for brush control. Both pastures have been grazed moderately for the past five years. Increased forage production was 54 percent in the sagebrush-grass openings and 105 percent in the oakbrush-grass as a result of brush control. Also, an increased percentage of utilization of understory forage occurred where brush control was effective.

SUMMARY

Herbicide treatments for controlling Gambel's oak have not provided satisfactory control in all tests over the past few years. Herbicide mixtures including Tordon have given the best control of oakbrush resprouting. Studies of root reserve carbohydrates indicate best results from herbicide treatments should be after the full leaf stage, about July 1, in Southwestern Colorado.

Significant benefits from controlled oakbrush at the San Juan Basin Branch Station include increased soil moisture which has resulted in increased forage production and pounds of beef per acre.