

FACTORS INFLUENCING OAK KILL WITH 2, 4, 5-T IN EASTERN OKLAHOMA

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Commercial applications of phenoxy herbicides has become one of the most economical and effective methods of controlling undesirable woody plants in Oklahoma. Increased emphasis has been placed on aerial application of these herbicides in controlling brush on grassland. Fact Sheet No. 2754 gives the herbicides and rates to use for different types of brush in Oklahoma.

There has been considerable progress in the field of aerial application for brush control, but many problems still exist. Erratic response of a given brush species to commercial herbicide application is often observed. The reason for these erratic results are often unknown.

The most widely used herbicide the past few years for brush control in eastern Oklahoma has been 2, 4, 5-T. Benny Eaton, under the direction of Harry M. Elwell and Paul W. Santelmann, conducted a three year field study to investigate factors involved in the varying defoliation responses of blackjack oak and post oak from commercial treatments with 2, 4, 5-T in Oklahoma. Thirty-six variables were studied on commercial spray treatments at seventy-nine locations. These factors were correlated with oak defoliation to determine what influence each had on the effectiveness of 2, 4, 5-T. All areas were supposed to

be treated with 2 lb/A of 2, 4, 5-T in 5 gallons/A of diesel oil-water emulsion. Samples collected from various applications showed the mixtures contained 2 pounds of 2, 4, 5-T per 5 gallons of emulsion. Fifty-two of the sites were first time treatments and twenty-seven were retreatments.

Information obtained from this study along with other work reported in the literature are the basis for conclusions reported in this publication.

Oak Growth Conditions When Treated

1. Treatments made prior to full leaf expansion can be expected to be less effective than treatments made soon after full leaf expansion. The best spray period for oak is generally from May 20 to July 1 for a first application. Late treatments after leaves are heavily coated with cutin and waxes are usually less effective.

2. Late frost can have an effect on amount of defoliation from 2, 4, 5-T treatments. In this study maximum defoliation of oaks was obtained when there was an interval of six to eight weeks between the last killing frost and treatment.

3. Retreatments are most effective June 5 to July 15 if treatments are made the year before. It is generally suggested that retreatments be made either one or two years after the original treatment.

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4. Fire before herbicide treatments can cause ineffective oak control. It is suggested that treatments be delayed one or two years when fire has occurred. Effectiveness of 2, 4, 5-T does not appear to be reduced by fire after a two year interval between the fire and treatment.

5. Grass growth in wooded areas is a good deterrent to root sprouting. A dense stand of native grasses under good growth conditions is competitive against root sprouting. This does not mean that no root sprouting will occur when good grass stands are present, but less root sprouting and slower growth of the sprouts have been correlated with good grass management.

Climatic Conditions

1. Air temperature in the range of 50 to 70 F appears to be optimum for effective spray applications. Some conflicting conclusions are presented in the literature on the relationship between temperature and plant susceptibility to 2, 4, 5-T. Usually high temperatures occur late in the season when other factors may cause poor brush control.

2. High humidity (above 60 percent relative humidity) has favored increased effectiveness of 2, 4, 5-T on oak defoliation. It is suggested that a higher humidity probably favors a longer absorption time of 2, 4, 5-T by the leaves, and therefore more penetration of the chemical into the leaves.

3. Good rainfall within a month before 2, 4, 5-T application favors greater defoliation. Rainfall during the dormant season or after application appears to have little or no effect. Good growing conditions at time of application of a hormone type herbicide favors better kills from the chemical.

Application Factors

1. The degree of spray coverage showed a highly significant correlation

oak defoliation by 2, 4, 5-T in the study conducted by Mr. Eaton. Increased spray coverage from 10 to 19 percent gave higher defoliation values, but increased coverage above 20 percent, did not increase 2, 4, 5-T phytotoxicity. Spray patterns showed a deposit of 50 to 60 drops per square inch in areas where high defoliation values were obtained.

2. The choice of an optimum swath width for maximum effectiveness is somewhat controversial. In the study by Mr. Eaton, a swath width of 33 to 40 feet was the most effective in the tall brush in eastern Oklahoma. Research work in western Oklahoma with low growing brush indicates wider swath widths are as effective there. Marking swaths and good flagging are necessary for adequate coverage in brush spraying. Good radio communications between the pilot, flagmen and the spray mixing team helps to eliminate skips and poor application.

3. Three different low volatile esters of 2, 4, 5-T performed about equally in defoliation of oaks in the study cited in both initial treatments and retreatments. Oil-water emulsions generally used are adequate for effectiveness of these herbicides. Some studies indicate that retreatments may not be effective if initial treatments give less than 70 percent defoliation.

Edaphic Factors

Soil moisture, soil type, soil depth, topography and soil temperature variations had little or no effect within the limits of soils used in this study. Soil moisture would be expected to have an effect if the soil became dry enough to retard growth. As stated earlier, the amount of rainfall within a month of application had an effect on defoliation.

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