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Update on leafy spurge research at Montana State University

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None of the new herbicides that have been tested have controlled leafy spurge regrowth after one year. Rather than review screening trials, this report will cover three unique experiments. These experiments are currently in progress, so only methods and some preliminary results will be discussed.

The first experiment investigates the cultural practice of pulling leafy spurge to control stem regrowth. Leafy spurge pulls easily from the ground and the root sustains a significant amount of damage. To quantify the amount of root damage and the energy required to pull leafy spurge, measurements were taken on the stem diameter, root diameter, length of root material pulled, and the foot-pounds required to pull each plant from the ground. With a pull of 4 to 6 ft lbs, 2.4 to 4.8 cm of root material was removed. A timing experiment was established to determine if there is an optimum time to pull leafy spurge so that there is minimal regrowth. Plots were hand pulled every 2 weeks throughout the growing season in 1982. Plots pulled on June 30, 1982 produced the best control of regrowth with 94% control on Sept. 1, 1982 and 35% control the following year on June 12, 1983. Percent control was determined by measuring stems/ft². Visual ratings on June 12, 1983 were 80 to 90% control since the regrowth was not vigorous.

Effect of "solarization" on leafy spurge growth was measured. Clear and black plastic was laid out on March 22, 1983 after the snow disappeared from the study site. Soil temperatures were measured at 5 and 10 cm depths. Air temperature and stems/ft² were measured on each treatment once a week. Temperatures at both depths were significantly greater under clear plastic than with no plastic on all measurement dates except when snow covered the plots.

The number of stems/ft² was directly correlated with increased temperatures. An extreme proliferation of stems (166/ft²) was observed under clear plastic with 82° F at 5 cm and 72° F at 10 cm on May 27, 1983. On the same date plots with no plastic produced 56 stems/ft² with temperatures of 60° F and 53° F at 5 and 10 cm depths, respectively. With the high temperatures under the clear plastic stems died while the number of stems under the black plastic and or no plastic continued to increase. The plastic will be removed in late June and soil temperatures and stem counts will be measured to determine if the control treatments with no plastic will eventually produce the same number of stems/ft² which emerged under clear plastic. Temperatures on the plots that were covered with

plastic will be monitored to see if the decreasing soil temperatures will recreate an optimum at which root buds will be induced to grow.

We have examined the constituents of the leafy spurge plant in an attempt to develop a use for the plant. The oil fraction of the plant may have value due to its high caloric value. However, the extraction process and feasibility of a centralized facility to produce these oils for fuel is not economically attractive at present. The high caloric characteristic can most effectively be used by utilizing the entire plant biomass for fuel to heat farms and ranch buildings on a localized basis. Technologies for harvesting and burning crop residues are available. Leafy spurge could be easily adapted and provide much greater energy per area of land per year than other alternative fuels.