Propane Flaming Genista monspessulana Resprouts

Janet Klein and Shannon Fiala
Marin Municipal Water District, 220 Nellen Avenue, Corte Madera, CA 94976

Abstract: Propane flaming has been shown to be an effective tool in managing Genista monspessulana seedlings. The Marin Municipal Water District (MMWD), in conjunction with the Marin Conservation Corps (MCC) / AmeriCorps Program, tested the efficacy of single-pass propane flaming on resprouting G. monspessulana plants that had been repeatedly mowed. We compared the mortality rates of single-pass flaming of resprouting G. monspessulana with that of a control treatment–brushcutting. We also examined the impact of stump size on survivorship. We found a statistically significant difference in the effects of propane flaming versus brushcutting, with propane flaming resulting in higher mortality rates and greater decreases in percent cover and overall G. monspessulana growth post-treatment. Propane flaming resulted in a mortality rate of 80%, while the control treatment of brushcutting resulted in a 2% increase in the mean number of live stems per plot. Size had a statistically significant impact on survivorship (p-value < 0.01). Mean root crown diameter of surviving plants was 13.6 cm while the mean root crown diameter of killed plants was 7.8 cm. The largest individual to be killed by flaming had a root crown diameter of 31.5 centimeter. It should also be noted that the G. monspessulana mortality rate in the size effect trial was only 54%; we believe this is a direct result of our intentional selection of very large resprouts for inclusion in the trial.

Results: Treatment Effects
The treatment of brushcutting previously mowed G. monspessulana followed by propane flaming resulted in statistically significant differences in percentage of surviving G. monspessulana stems per plot (p < 0.001) while the control of brushing alone resulted in no statistically significant change in live G. monspessulana stems per plot (p = 0.44). Treatment plots also experienced a statistically significant increase in percent cover of G. monspessulana (p < 0.002) with mean percent cover per plot dropping from 44.4% to 14.4%. Control plots experience a statistically significant increase in percent cover of G. monspessulana (p < 0.002) with a mean percent cover per plot increasing from 5% to 51.6%. Propane flaming decreased the mean stem height per plot from 9.4 cm to 6.8 cm, although this was not statistically significant (p < 0.15). In control plots, the increase in mean stem height from 10 cm to 56.7 cm was statistically significant (p < 0.001).

Size Effects
The size of G. monspessulana individuals subjected to propane flaming was correlated with survivorship. There was a statistically significant difference in the mean root crown diameter of individuals that survived 3 months following treatment (p < 0.002) with mean percent cover per plot increasing from 5% to 51.6%. Propane flaming decreased the mean stem height per plot from 9.4 cm to 6.8 cm, although this was not statistically significant (p < 0.15). In control plots, the increase in mean stem height from 10 cm to 56.7 cm was statistically significant (p < 0.001).

Discussion and Conclusions: Propane flaming is an effective method for killing previously brushcut G. monspessulana, although the size and age of the individual plants targeted for treatment impacts survivorship. We believe greater size results in greater survivorship because individual plants with larger root crown diameters have correspondingly higher nutrient reserves stored in their roots and are better able to recover from a flaming treatment. Propane flaming resulted in the death of some very large individuals, but we believe the torch operator applied flame to these individuals for longer periods of time than to smaller plants. Our two trials, treatment effect and size effect, resulted in mortality rates of 80% and 54% respectively. We believe the difference in these mortality rates reflects the effect of size on survivorship. In choosing individuals for the size effect trial, we intentionally included individuals at the high end of the overall size distribution of G. monspessulana in the project area, thus selecting a disproportionate number of likely survivors.

Propane flaming appears to be a viable option for killing previously brushcut G. monspessulana. As expected, it is most efficient when used on younger, smaller G. monspessulana individuals. The method is slow and the equipment somewhat cumbersome, particularly on steep slopes. Its safe use is limited to the rainy season. Nonetheless, it offers a non-chemical alternative for effective G. monspessulana management.