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## Notes

## Handheld Flame Cultivators as a Management Option for Woody Weeds

Katherine M. Ghantous, Hilary A. Sandler, Wesley R. Autio, and Peter Jeranyama\*

Dewberry is a weed found on cranberry bogs that spreads quickly, causes high yield loss, and has no effective management strategy. Finding options to manage damaging perennial weeds in a perennial crop system, such as cranberry, is key to long-term industry sustainability. This study presents preliminary data on the use of flame cultivation (FC) in cranberry weed management. Utilizing weeds transplanted from commercial cranberry farms to a prepared area at the UMass Cranberry Station, we evaluated three handheld propane-fueled FC instruments: infrared torch, open flame torch, and an infrared torch with a spike. A single, midsummer exposure (zero, low, medium, or high duration) with each FC was tested. The industry standard of using a single wipe application of an herbicide solution (111 g L<sup>-1</sup> ae glyphosate, isopropylamine salt) was also included in the evaluation. Dewberry shoot, root, and total biomass decreased linearly as exposure increased; the effect of FC tool type was not significant. Data indicated that, regardless of the specific torch utilized, spot treatment with FC reduced dewberry biomass. The results of this exploratory study suggest that FC may offer an alternative technique for managing woody weeds and that further research is warranted.

**Nomenclature:** Glyphosate; dewberry, *Rubus* spp.; cranberry, *Vaccinium macrocarpon* Ait.

**Key words:** Perennial woody weeds, flame weeding, thermal weeding, integrated weed management, nonchemical options.

*Rubus* sp. es una maleza que se encuentra en el cultivo de arándano y que se dispersa rápidamente, causa altas pérdida en rendimiento y no tiene una estrategia eficaz de manejo. Encontrar opciones para el manejo de malezas perenes dañinas en sistemas de cultivos perennes, tal como el arándano, es clave para la sostenibilidad de la industria a largo plazo. Este estudio presenta información preliminar sobre el uso de un quemador de llama (FC) en el manejo de malezas en este cultivo. Utilizando malezas trasplantadas de granjas comerciales de arándano hacia un área preparada en la estación de arándano en la Universidad de Massachussets, evaluamos tres instrumentos manuales de gas propano FC: antorcha infrarroja (IR), antorcha de llama abierta (OF) y antorcha infrarroja con una espuela (IRS). Se evaluó una sola exposición a la mitad del verano (duración cero, baja, media o alta) con cada FC. También se incluyó en la evaluación el tratamiento estándar de la industria haciendo una sola aplicación de herbicida con una solución de 111 g/L ea de glifosato, sal isopropylamine. La parte aérea, la raíz y el total de la biomasa de *Rubus* disminuyeron linealmente conforme la exposición se incrementó y el efecto del tipo de herramienta FC no fue significativo. Los datos indicaron que sin importar la antorcha específica utilizada, el tratamiento localizado con FC redujo la biomasa de *Rubus*. Los resultados de este estudio exploratorio sugieren que FC puede ofrecer una técnica alternativa para el manejo de malezas leñosas y que se justifica investigación adicional.

Flame cultivation (FC) is a method of weed control in which target plants are exposed to brief periods of high temperature. Interference with cellular processes such as photosynthesis occurs even with very brief (e.g., 125 ms) exposures to high temperatures (Ellwanger et al. 1973). Heat is thought to disrupt and destroy cellular membranes and lead to necrosis (Daniell et al. 1969). Many different methods of FC are available ranging from open flames, to infrared (radiant heat), hot foam, and boiling water. Various FC methods have been used successfully in annual crops such as carrots (*Daucus carota* L.), corn (*Zea mays* L.), onions (*Allium cepa* L.), and potatoes (*Solanum tuberosum* L.) as both preemergence and postemergence weed controls (Diver 2002).

Weeds present a significant threat to cranberry yields. Dewberry is a perennial woody weed found on cranberry bogs. It is identified as Priority 1, meaning that it is difficult to control, spreads quickly, and can cause significant loss of crop (Else et al. 1995). A recent grower survey showed that 80% of respondents indicated dewberry was present on their bogs, and 62% reported it as being “very difficult to control” (Ghantous and Sandler 2010).

Dewberry is a prostrate woody vine covered in hairs or thorns, with trifoliate leaves and white flowers (Jensen and Hall 1979). Vines arise from existing plant crowns or new buds along rhizomes and spread vegetatively. In addition, vine tips that touch the ground can form roots and stems and spread in this manner. The biennial canes reproduce and senesce in the second year. *Rubus* spp. are highly variable, readily hybridize with each other, and are difficult to identify to species (Jensen and Hall 1979; Sandler 2001).

Current control methods (e.g., hand pulling, herbicide wipes and sprays, clipping, pruning, and spot renovation of heavily infested areas) fail to provide satisfactory management (Sandler 2010b). Glyphosate use on cranberry farms provides

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\*First and third authors: Graduate Research Assistant and Professor, Department of Plant, Soil, & Insect Science, 101 Fernald Hall, 270 Stockbridge Road, University of Massachusetts, Amherst, MA 01003; second and fourth authors: Extension Assistant Professor, University of Massachusetts Cranberry Station, P.O. Box 569, East Wareham, MA 02538. Corresponding author's E-mail: kghantou@psis.umass.edu