

Green Scene

Weeds in the Hot Seat: A Primer

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Chemical-free weed management is a challenge for green-industry professionals, so Mario Lanthier of CropHealth shared his tips for dealing with weeds in a variety of situations at two seminars last month. Among the options Lanthier presented were these heat-based solutions.



1. Flaming is an effective tool to manage weeds on paved surfaces and other non-crop areas. Many practitioners in British Columbia tried flaming in the 1990s, only to abandon the practice because associated labour costs are higher than traditional herbicide spraying. Spraying, however, is no longer an option for many landscape managers in municipalities, where new bylaws restrict the use of pesticides. It is time for our industry to revisit this practice and conduct applied research on the tools commercially available.

2. Pictured here is a large flamer at work in Denmark. In many cities of Europe, the use of herbicides is prohibited for weed control on hard surfaces. Some bans have been in place for 10 to 15 years, which has forced intensive research on non-pesticide methods. Flame weeding is reported to be "the most commonly applied thermal weed control on hard surfaces" and in regular use in countries such as Denmark and Sweden (Weed Research, 2004). Commercial equipment is readily available, including hand-pushed shielded flamers for use on small areas. *Photo: P. Kristoffersen, Denmark.*

3. A BC farmer is "flaming" weeds in his apple orchard. Excellent research comes from organic farming, where weed management is difficult because herbicides are not allowed. What is important is the intensity of the heat by unit area: a hot flame can be applied for a very short time, while a warm flame must be applied for a longer time.

Exposure to heat of 55 to 95 degrees Celsius for 0.1 second is enough to kill leaf tissue – just one tenth of a second over the weed! No need to stand there for minutes!

4. The fingerprint test is a good way to verify the effectiveness of any heat treatment, including flaming. Heat triggers denaturation of a plant's cellular proteins, leading to cell rupture and desiccation. After flaming, take a weed leaf and press hard with your thumb - if the finger mark stays imprinted, the leaf has suffered irreparable damage and will die. A common mistake is to burn the weed to a black charcoal – it is not necessary, except for the psychological satisfaction of seeing a dead weed! *Photo: Dr. S. Knezevic, University of Nebraska.*

5. Grasses are very tolerant to flaming, because their growing point is underground and protected from the treatment. This is also true of most perennial broadleaves and some annuals such as Shepherd's purse and scentless chamomile. The above-ground portion may be killed, but these weeds will re-grow from the meristems and repeated flaming is needed. On the other hand, weeds with unprotected growing points and thin leaves are easy to control with flaming, such as Lamb's-quarters, groundsel and chickweed.

6. Another non-chemical method is to pour boiling water on target weeds. It is a good suggestion for residential customers looking for organic methods.

It is more effective on seedlings and drought-stressed plants and less effective on wet weeds, and must be repeated for difficult-to-control weeds. Another consideration: the water must be near the boiling point, so reduce the time between boiling and walking to the target weed.

7. Acetic acid is registered as a herbicide in commercial and domestic formulations. The commercial formulation is 20%, stronger than household vinegar (5%). Acetic acid is an "excluded" pesticide in the provincial legislation, meaning there is no need for a license or certificate to buy and apply, and most municipal pesticide bylaws allow its use. It is a contact herbicide that controls only the above-ground portion of the weed. Remember that using acetic acid instead of glyphosate is not "IPM": it is strictly product replacement. Integrated Pest Management requires a thorough understanding of the plants managed, a strong emphasis on prevention methods, and control methods that combine non-chemical with chemical.

8. This commercial hand-held machine uses infrared radiation. Propane gas burning at high temperatures heats a ceramic surface, which then radiates heat to the target weed. The method is less effective than flaming because of lower heat transfer to the weed. However, it does not have an open flame, and is thus quite appropriate for small residential sites, windy locations, or other situations where flaming cannot be used (be careful not to start a fire in the mulch of the shrub bed!).