● ALTERNATIVES

RADIANT HEAT WEEDERS: MANAGING WEEDS WITHOUT HERBICIDES

BY ANNIE ROSE FAVREAU

An uncommon, but promising, solution to managing unwanted plants is technology that has been used in Europe for about a decade—the radiant heat or infrared weeder. With a metal body tapering off to a weed-lethal head capable of reaching temperatures of 1800 degrees,[1] the most common form of this garden tool looks like a cross between something out of the most recent George Lucas film and a conventional flame-weeder. However, this isn't just another flash in the pan. "This [infrared] technology is here to stay because of its advantages over other forms of weed control," say Anne and Louie Murgg of Forevergreen, Inc., a leading retailer of these environmentally friendly weeders.

U.S. Dept. of Agriculture/Ken Hammond

Managing unwanted plants in a complicated urban landscape can be challenging. New radiant heat or infrared weeders offer an effective, economical alternative to herbicide use.

How Does Radiant Heat Technology Work?

The technology varies from model to model and some (especially the larger versions), use combinations of radiant heat and water or air. However, the most common setup in the United States and Canada uses a ceramic heating element that creates extremely high temperatures.[1,2] Because of the design of the tool, the heat (in the form of infrared radiation) is controlled and directed towards the weed.[2] The intense heat boils the moisture in the plants' cells, which causes them to burst.[1-3] "The weeds don't need to be scorched," remarks Greg Prull of Sunburst Inc., a company developing tools for large scale thermal weed control. The leaves will wilt immediately,[1,2] Since the proteins in the cells are damaged, photosynthesis stops and the plant will die.[1,2]

Although the tool directs the heat towards the weed rather than upwards or sideways,[4] the heat source must be kept close to the plant. If held correctly near a weed (the most effective distance is about a half inch above the plant) the heat will also penetrate down into the ground a few millimeters, killing wind-borne seeds and bacteria, but leaving plenty of beneficial microbes in the soil.[1,2]

When Are Infrared Weeders Effective?

The infrared tools come in a wide range of sizes, designed to be used in different situations. For homeowners or spot treatment, one of the small handheld versions resembling a flame weeder (with a price starting at around $160) is ideal. For bigger areas, like parks, athletic fields, hospitals or schools, one might want to buy the infrared weeder that looks like a push mower. For roadsides, railway tracks, vineyards or crops, one of the large versions that can be mounted on a truck with a boom extension or can be pulled by a tractor would work best.

Because of the nature of the technology, the weeders should work on most plants, from clover and dandelions to blackberries and saplings, and should work in any climate.[1] They can even be used to control the spread of difficult plants like ivy.[5] Established or woody plants will require more treatments than a new plant.[1,5]

When you use or plan to use a radiant heat weeder, consider how to make the area that needs treatment inhospitable to weeds. Could desirable plants, maybe an attractive ground cover, be planted? Is some kind of mulch or weed barrier appropriate? Are there other ways to redesign the landscape to prevent weed problems? As with any weed control tool (including herbicides), repeated retreatment will likely be necessary unless such steps are taken.

The time you need to spend heating each weed varies.[1] For most weeds, about 1.5 seconds should be enough, but you will need to increase the time for hardier plants.[1,2] You can tell when the weeds have been sufficiently heated, because their leaves will look wilted and turn a darker green almost immediately after application of heat.[1,2] Leaves should not look charred.[2] For larger areas with the larger models of weeders, speeds vary between 1 and 3 miles per hour, depending on weed

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density.[1,3]

Upcoming Developments in Radiant Weeders

People have been using fire and heat for hundreds of years as a way of preventing or destroying plants. With the development of flame weeders fire could be used at a more controllable level. Adapting infrared technology for weed eradication is one more step in the direction of manageable and cost effective weed control.

Radiant heat technology is quickly showing its caliber. The preliminary results of a study at Nova Scotia Agricultural College shows that the infrared radiation techniques are more effective than flame or steam weeders.[6] Better machines are currently being developed. "By the end of the year [2003] we will have newer, faster models on the market," Anne and Louie Murgg predict.

Sunburst Inc. is a company currently experimenting with combinations of hot water, air and infrared heat. The company would like to adapt the technology for larger machines that will be economical for weed control in commercial areas.[3] However, these tools have not been widely manufactured in the U.S. as of yet, and some of the prototypes still have problems that need to be worked out.

Advantages of Radiant Heat Weeders

The most obvious advantage of infrared weeders is that they are chemical-free and have low environmental impact. Other advantages include the following:

- After the initial investment, they have minimal cost (starting at 2 cents per 100 square feet).[1]
- Their range is good since there are no hoses or cords.
- For all but the largest version of the weeders it only takes one person to operate the machines.
- They run on propane, a clean fossil fuel and use relatively small amounts of fuel. (Handheld models use about 2.5 gallons of propane per 8-hour day).[2]
- Another advantage of infrared weeders is that, unlike flame weeders, they can be used in situations where an open flame would be extremely dangerous.[1,2] E.J. Hook of Integrated Solutions (a landscape manager in Seattle, Washington) says he uses his weeder where there is potential for damaging nearby plants, or when there are nearby fire risks.
- The infrared weeders are pretty tough and long lasting. "I still am using the original machine I bought four years ago with no problems," says Hook.

Precautions

Before you begin using an infrared weeder, the following steps are important to your safety and to keep your machine operating well:

- While these weeders pose less of a risk for fires because there is no open flame, extreme caution should be used when handling them. Talk to your local fire professionals with regards to any rules they may have on these tools, Hook warns. Generally most regulations have to do with open flame weeders, but it's still good to check.
- Additional regulations regarding the storage and transport of propane should be taken into account.
- Putting the head of a handheld infrared weeder directly onto the plant or ground is not advised. If pressure is applied, the tool may be damaged.
- Hook also cautions to keep debris out of the hoses and valves as this can interrupt the gas flow.

An example of a handheld radiant heat (infrared) weeder.

Retailers and Manufacturers

There are many retailers and manufacturers of infrared weeders in Europe. For example, HOAF Infrared Technology (Germany)[7] offers a full line, from handheld models to agricultural machines.

Retailers in North America aren't as easy to find. Forevergreen, Inc. (www.chemfree-weedcontrol.com), focuses on the ECO-WEEDERs, an extensive line of tools (including handhelds, one-wheeled, and two-wheeled versions) manufactured by the Swiss company Messerli Sessa.[8] Sunburst Inc. (www.thermalweedcontrol.com) is a company in Eugene, Oregon, that is developing prototypes of a unique combination machine for large scale areas.

Conclusion

While this technology may be relatively new to the United States, infrared weeders are already displaying their value, not only to homeowners, businesses and farmers, but also to hospitals, parks and other public places. Environmental friendliness, versatile models, and many uses secure infrared weeders a place in promoting alternatives to pesticides.

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