Transportation Center

Herbicide Alternatives Research

Massachusetts Transportation Research Program

EOT Massachusetts Executive Office of Transportation

U.S. Department of Transportation Federal Highway Administration

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July 2008 **Office of Transportation Planning** SPRII.03.23

Technical Report Document Page

1. Report No. SPRII03.23	2. Government Accession No. n/a	3. Recipient's Catalog No. n/a
4. Title and Subtitle Herbicide Alternatives Research		5. Report Date July 2008
		6. Performing Organization Code n/a
7. Author(s) Allen V. Barker and Randall G. Prostak		8. Performing Organization Report No. UMTC-07-02
9. Performing Organization Name and Address University of Massachusetts Transportation Center 214 Marston Hall 130 Natural Resources Road Amherst, Massachusetts 01003		10. Work Unit No. (TRAIS) n/a
		11. Contract or Grant No. ISA # 5MS3378
12. Sponsoring Agency Name and Address Executive Office of Transportation and Public Works 10 Park Plaza, Room 4150 Boston, Massachusetts 02116		13. Type of Report and Period Covered Final Report August 17, 2004 to June 30, 2007
		14. Sponsoring Agency Code n/a
15. Supplementary Notes		

16. Abstract

Management of vegetation is an important element of roadside maintenance for safety and aesthetics. Management techniques depend on many factors, which include the desired appearance of the roadside, the desired type of vegetation, roadway location, traffic, soil and topographic conditions, and adjacent land use. As part of its Vegetation Management Plan, the Massachusetts Highway Department has committed to exploring ways to minimize the use of herbicides and contracted with the University of Massachusetts to explore alternatives to conventional herbicides in management of vegetation. Based on the review of the literature and results of the review of vegetation management practices by other state departments of transportation, several methods of management were selected for investigation. Feasibility of successful use, environmental concerns, and budgetary factors were considered in selection of methods to investigate. These methods included use of herbicides that are alternatives to conventional, chemical herbicides and use of mechanical treatments of mulches, hot water, fire, and mowing. These methods were evaluated in greenhouses, on roadside sites, and in field plots on a research farm. Alternative methods were compared with use of conventional herbicides to assess relative efficacy of treatments. Research was conducted for two years. Alternative herbicides that demonstrated immediate or short-term suppression of growth of vegetation were pelargonic acid and clove oil. However, the immediate foliar damage after spraying of pelargonic acid was much more injurious than the injury from clove oil. These materials had efficacy against herbaceous plants and woody vines. The efficacy lasted for three to six weeks after which growth was not distinguishable from untreated vegetation. Repeated applications of these herbicides will be necessary for season-long efficacy. Formulations of citric-acetic acid or a citrus-derived product (limonene) gave no control or only weak suppression of vegetative growth soon after application, and no suppression was evident after three to six weeks. Steam or hot water sprayed by implements was effective against herbaceous vegetation but not against woody species. Efficacy of heat treatments, including torching, lasted for three to six weeks. Mulches of bark or woodchips were strongly suppressive against emerging vegetation and suppressed growth for two years. Because of the cost of materials and labor and need for repeated seasonal applications, all of the alternative practices will cost substantially more than the use of conventional herbicides.

17. Key Word Roadside vegetation, vegetation management, weed control, alternative herbicides, organic herbicides, mechanical weed control, mulches, thermal weed control	18. Distribution Statement Unrestricted

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 238	22. Price n/a

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