

Applicator Training Materials on Use of Chemicals for Vegetation Management

HARVEY A. HOLT

A set of training materials, manuals and videos, has been produced for those applying herbicides and plant growth regulators on roadsides. The events leading to their development, the content, and indications of known usages are described.

Roadside applicators use herbicides and plant growth regulators that can control plants within and without the target area, the narrow roadside right-of-way. This area is in constant contact with adjacent sensitive, nontarget sites. The roadside applicator is subject to continuous public exposure and scrutiny. These applicators must be well trained. However, the Environmental Protection Agency/U.S. Department of Agriculture (EPA/USDA) core and category manuals are too broad. The core manual covers all pests and pesticides, whereas herbicides and plant growth regulators are the primary chemicals used on roadside rights-of-way. The category manual contains very little material specifically identified with roadside vegetation management. Since most states do not have right-of-way extension counterparts at the university level, few states have adequate training materials and comprehensive programs. A large number of roadside applicators do not have access to any education after certification because of county and state restrictions against employees traveling outside their governmental boundaries. Most temporary summer employees receive just enough training for certification.

MODULE BACKGROUND

A coalition of basic manufacturers recognized the seriousness of the training problem and provided the initiative that resulted in new applicator training materials. The manufacturers, American Cyanamid, DowElanco, DuPont, and Monsanto, in cooperation with USDA's Extension Service (USDA-ES) and EPA have provided pesticide applicator training materials to the states that should not only enhance the technical competence of the roadside applicator but also be of value to all rights-of-way applicators. The person becoming initially certified should be better educated, and the training materials should also serve as continuing education material for people already certified.

The National Curriculum Committee was organized by USDA-ES with representatives of state departments of transportation, commercial applicators, and pesticide training co-

ordinators. This committee established the modular format and developed the technical outlines for each module. USDA-ES then sent a request for proposal to all states for development of the training materials. Purdue University prepared a proposal and was awarded the contract in summer 1989.

The module outlines were distributed at the 1989 meeting of the National Roadside Vegetation Management Association (NRVMA). Comments were incorporated into the final outlines. Written texts for each module were distributed at the 1990 NRVMA meeting for review and comments. The corrected documents were the basis from which scripts were written for video production. Video footage was shot nationwide during spring and summer 1991. The final product, videos and manuals, was presented at the 1991 meeting of NRVMA, again with the opportunity for comments and corrections. Corrections were made and final product distributed to all states in winter 1991-1992.

MODULE CONTENT

Each module is prefaced with learning objectives and followed with test questions so that the applicator knows what is expected to be retained.

Module 1: Roadside Vegetation Control Is Necessary

Control of roadside vegetation is necessary to meet safety and legal requirements, for road structure maintenance, and for appearance. Safety and legal requirements include maintenance of a safety recovery zone (clear zone), sign visibility, sight distance, and noxious weed control. Vegetation control improves drainage, slows roadbed degradation, prolongs the life of roadside hardware, and affects snowdrift control, fire hazard reduction, and erosion control. Vegetation control also enhances the delineation and beauty of the roadside. Control measures make use of mechanical, manual, chemical, and biological means; native plant materials; and cultural practices. Roadside vegetation control contributes to safer, more relaxing travel for the motoring public. Controlling this vegetation requires that a variety of methods be used. Each control method has advantages and disadvantages, and no single method can be used for all weed control problems. Integration of the control methods gives the most cost-effective program with the least environmental disturbance. The text is 10 pages and the video is approximately 12 min.

Module 2: Plant Biology for Roadside Vegetation Managers

Plant biology includes plant types (grasses, broadleaves, woody plants), growth stages, life cycles (annual, biennial, perennial), and conducting tissue (xylem and phloem). Factors influencing plant growth include water, soil, temperature, relative humidity, and light. Plants can be grouped into similar sets for vegetation management purposes. All plants, whether they are grasses, broadleaves, or woody plants, go through similar growth stages and have very specific life cycles. They respond similarly to environmental influences, although some plants may be more adapted to environmental extremes than others. Knowing their biology helps plan effective management programs, be it to suppress or release the plants. The text is 10 pages and the video is approximately 10 min.

Module 3: Characteristics of Chemicals Used for Roadside Vegetation Management

After studying this module, the applicator should (a) understand terms used to describe characteristics and actions of herbicides and plant growth regulators and (b) know some important characteristics of herbicides and plant growth regulators that determine the use and application of these chemicals for roadside vegetation management. The herbicides and plant growth regulators registered for use on roadside rights-of-way present the opportunity to control almost all plant species or to selectively manage for broad groups of plants. Most programs will use only a small number of the products available. Each product has its unique advantages and problems. The label is the best source of use information. The text is 12 pages and the video is approximately 16 min.

Module 4: Weed Control Programs for Roadside Vegetation Management

The objectives of vegetation management programs can be grouped into nonselective and selective control. Each has its place in roadside vegetation management. Nonselective weed control is the control of all weeds. Selective control means that some plants are released to grow as a result of the treatment method chosen. Nonselective weed control is important around guide rails, median barriers, signposts, delineators, fences, structures (abutments, headwalls, inlets), storage yards, road shoulders, median islands, and ditches. Selective vegetation control is involved in broadleaf weed control, ditches, special grass control, woody plant control, and the use of plant growth regulators. Some parts of the roadside are universally managed to stay free of weeds, and some parts are managed to promote some type of plant cover. Each road managing agency will have specific objectives and programs that reflect the plants and climatic conditions of that locale, budget, available equipment, and public perception of what constitutes acceptable management. The text is 10 pages and the video is approximately 7 min.

Module 5: Application Equipment for Roadside Vegetation Management

This module presents some of the equipment used to make broadcast and directed applications of liquid sprays of herbicides and plant growth regulators on roadsides. Broadcast equipment includes booms with conventional and Raindrop spray tips, boomless spray equipment (off-center tip, straight stream tip, Boom Buster nozzle, Radiarc, Directa-Spra, CDA), and computer injection sprayers. Equipment for directed applications include hand gun, backpack, trigger pump, spot gun, wiping applicator, and Visko-Rhap invert emulsion applicator. Some of the equipment used to apply dry herbicide formulations, such as granules and pellets, is also discussed. The array of equipment ranges from very cheap to very expensive. Each has advantages and disadvantages. Excellent results can be obtained with poor equipment, and poor results with excellent equipment. The text is 12 pages and the video is approximately 9 min.

Module 6: Equipment Calibration for Roadside Vegetation Management

Calibration is the process of measuring and adjusting the amount of chemical a piece of spray equipment will apply to the target area. Proper calibration is essential. After studying this module, one should be able to determine that the correct amount of product is being applied for a variety of application situations and equipment types by being able to determine area, speed, gallons per acre, amount of product to add to each tank, mix percent by volume, altered equipment speed and application rate per acre, amounts for partial mixes, and amounts for granule and pellet application. This module is a workbook with example problems as well as problems to test understanding. The text is 35 pages and the video is approximately 22 min.

Module 7: General Problems Encountered in Chemical Application for Roadside Vegetation Management

That an entire module describes things that can go wrong should make it apparent that an applicator is the person primarily responsible for the success of the vegetation management program. Attention must be paid to changing conditions on the roadside during application. Nothing teaches like experience, but bad experiences with chemicals can change entire weed control programs. After studying this module, the applicator should be able to recognize potential problems related to chemical use, including (a) registered for site of application; (b) physical barriers and obstructions (highway traffic, obstructions, accessibility, terrain, ditches); (c) environmental effects such as brownout, leaching, lateral movement, adjacent water and wells, nonapplicator exposure, off-site vegetation, backflash, and roadside loading and mixing; (d) climate/weather-related factors, such as dirt and rain; (e) equipment limitations that result in overapplication and pattern variances; and (f) plant factors associated with broad

spectrum control, no vegetation to release, invasion by other weeds, plant size, timing, and layered vegetation. General environmental concerns include spills, nontarget species, drift, endangered species, groundwater, and surface water contamination. The text is 12 pages and the video is approximately 11 min.

Module 8: Applicator/Operator Safety for Roadside Vegetation Management

Weed control is not without occupational hazards, whether the job is done with chemicals or with mechanical equipment. Study of this module should provide (a) an understanding of basic concepts of toxicology as they relate to exposure to herbicides and plant growth regulators, (b) awareness of the need for and types of protective clothing related to the use of these products, (c) the ability to make a rational decision on the need for protective clothing, (d) the ability to deal with emergency exposure occurrences, and (e) awareness of other personal safety practices related to mechanical and manual weed control practices. The text is 15 pages and the video is approximately 9 min.

Module 9: Public Relations for Roadside Vegetation Management

Public relations is a personal and professional responsibility. It is essential to the management of issues on the public mind. The most effective public relations programs are always in progress long before there is an apparent need. The techniques of public relations can produce fewer complaints, quicker resolution of conflicts, and improved support for roadside vegetation management. Study of this module should provide knowledge concerning (a) the importance of public relations, (b) the importance of the applicator in public relations, (c) how to inform the public and special interest groups, (d) how to deal with the media both reactively and proactively, (e) how to deal with complaints, and (f) planning for crisis man-

agement. The text is 10 pages and the video is approximately 9 min.

MODULE DISTRIBUTION AND USAGE

Two sets were sent to each state, one to the state lead agency responsible for regulation and the other to the pesticide applicator training coordinator. The national distribution of these materials required that they be applicable at the state, regional, and national level. The modular format was designed to encourage states to adopt individual modules that they believe to be particularly applicable. The modular format also makes it easier for states to update training programs. The masters are to be maintained by Purdue University for 5 years.

Since states are encouraged to duplicate and disburse copies of the training materials, it is impossible to know where and how the materials have been used. On the basis of personal communications, it is believed that the materials are being used in a variety of situations. Some state highway departments have placed copies in each regional office. A number of cities, counties, and commercial applicators have purchased the training materials. Several universities have purchased additional sets. The manuals have also been used as the primary training document for the rights-of-way category for some states.

The modules come in a multicolored set with each tape and manual color coordinated in a single binder. The manuals are saddle stitched for easy duplication. The interior print colors of red and black were chosen for duplication clarity. These training materials can be ordered from Agricultural Communication Service, Purdue University, Media Distribution Center, 301 South Second Street, Lafayette, Ind. 47905-1092 (317-494-6794). Tapes and manuals cost \$400 per set; sets of manuals only cost \$50 per set. A 10 percent discount will be given on orders of 10 or more of either; the discount is 25 percent on orders of 50 or more. Checks should be made payable to Purdue University.

Publication of this paper sponsored by Committee on Roadside Maintenance.