Special Report 98-1

Pesticide Use on Rights-of-Way in Kentucky

April 1998

Monte P. Johnson, Extension Specialist
Project Director, NAPIAP/PAT

Department of Entomology
Cooperative Extension Service
University of Kentucky • College of Agriculture

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Foreword

This report was prepared by the Cooperative Extension Service of the University of Kentucky College of Agriculture. Presented are the results of a survey focused on pesticide use on rights-of-way. Pesticide use on rights-of-way is critical to providing safe driving and railway conditions and unobstructed utility lines and to lessening liability for damage to private/public property. This project was funded in part by the National Agricultural Pesticide Impact Assessment Program, Cooperative State Research Education and Extension Service, United States Department of Agriculture.

This survey effort involved cooperation with the Vegetation Management Association of Kentucky. We are indebted to their Board of Directors and especially A. D. Cline for assistance in providing a mailing list. The right-of-way photographs on the cover were provided by the VMAK.

Special gratitude is extended to Dr. J. D. Green (Weed Science), A. D. Cline, and Dr. Jeffrey Stringer (Forestry) for critical reviews of this report. Special thanks is also extended to Matthew L. Barker, College of Agriculture statistical consultant, for assistance in analysis of data.

Special thanks to the Pesticide Education Program and Agricultural Information Services, College of Agriculture, Penn State University, for use of their photograph of spraying along a highway used on the cover.

Introduction

Rights-of-way are areas involved in common transport. They are essential for the proper functioning of a modern society and include:

- federal, state, county, and township highways and roads;
- public airports;
- railroads;
- electric utilities (including substations, switching stations, transmission lines, and distribution lines);
- pipelines (including pumping stations);
- public surface drainageways;
- public irrigation waterways;
- banks of public bargeways and areas around locks and dams;
- bicycle, bridle, and other public paths or trails (outside established recreational areas).

Rights-of-way may be found everywhere and are placed in every type of terrain, soil, climate, vegetation complex, and land-use area. Vegetation management on rights-of-way is desirable and necessary for a number of reasons, both aesthetic and practical, including:

- safety due to improved visibility on transportation rights-of-way,
- reduced fire hazard by the encouragement of less fire-prone plants,
- soil erosion control,
- assured continuity of utility services,
- promotion of health and comfort of the public,
- aesthetic values enhanced by the control of nuisance vegetation.

Rights-of-way generally must be kept free of large brush or trees—that is, maintained in an early stage of plant community succession which means that vegetation must be continually managed. However, maintaining land in an early stage of plant community succession often encourages the growth of persistent woody shrubs, such as multiflora rose, and vines, such as kudzu, that can be as undesirable as large woody plants. The type of vegetation management necessary will depend on the function of the right-of-way, as well as its topography, biology, and ecology. Of paramount consideration is the type of vegetation encountered. Undesirable vegetation includes those plants that:

- create a safety hazard or nuisance;
- impede the normal operation or functional activities of the right-of-way;
- are considered “noxious”;
- repress desirable vegetation;
- cause damage to rights-of-way structures, such as road surfaces, railroad ballast, utility wire poles or supports, and pipelines and pumping stations;
- provide harborage for undesirable wildlife;
- constitute a detriment to crops and cropland if allowed to spread.

Vegetation management is necessary and in most cases desirable, but since most rights-of-way are long and narrow, they often touch the property of many landowners. Neighbor conflicts may become magnified especially if vegetation management efforts are not contained within rights-of-way boundaries. Public relations problems between rights-of-way users and their neighbors are minimized when the public is informed of the vegetation management needs and methods and when vegetation management personnel know and execute a program with definite goals and plans.

The principal goal of vegetation management is to ensure the protection, operation, stability, continuance, and safety of the common transport involved. Other goals of a well-planned vegetation management program may be to:

- naturalize the right-of-way using indigenous plants, where possible, to make the right-of-way blend in with the surrounding landscape;
- reduce maintenance costs;
- reduce erosion or water quality problems;
- manage feed and/or shelter resources for wildlife.

Many specialized herbicides and plant growth regulators are used by applicators on rights-of-way in Kentucky; however, no information on the usage of these chemicals is currently available. It is critical to gain a better understanding of pesticide usage in this area to learn what chemicals are necessary for vegetation management and to support re-registration efforts. Also, among the concerns associated with right-of-way pesticide applications are worker health and safety and pesticide movement to nontarget areas. Consequently, a survey of pesticide usage on rights-of-way is very important to agricultural and public policy decision-makers in Kentucky and nationally as well.

Objectives

The objectives of this project were to determine:

- what pesticides are used on rights-of-way,
- what pests are the pesticides used for,
- what rates and number of applications are normally used every year,
- any acceptable alternatives and how they compare with usual treatments,
- data that may help support re-registration efforts.

Procedures

This survey project was endorsed by the Vegetation Management Association of Kentucky. With their assistance, a questionnaire was developed and a mailing list was generated consisting of 46 of the major vegetation managers located in Kentucky. In January 1997, a cover letter and questionnaire (see Appendix A) were mailed to these 46 agencies requesting their response by the end of February 1997. A follow-up letter was sent in mid-March 1997 (see Appendix A) encouraging those who had not responded to respond to the questionnaire. Resulting data were entered

into a Microsoft Access database file and verified. Data were analyzed with the assistance of the College of Agriculture statistics consultant. Data were subjected to analysis of variance (ANOVA) using chi-square statistics and placed in frequency tables. Since responses to the survey were low, no statistically significant results were obtained; however, useful information still resulted from the data analysis.

Results and Discussion

Eighteen usable responses were received from the group of 46 vegetation management agencies, resulting in a 39 percent response rate. Of the five vegetation types listed for right-of-way managers to identify as receiving pesticide applications, woody plants was the most common type, comprising 58.2 percent of the application jobs reported by respondents (Fig. 1). Other vegetation types were grassy weeds (18.4 percent), broadleaf weeds (13.3 percent), no vegetation or bare ground areas (8.2 percent), and general herbaceous plants (2.0 percent).

Summaries of total acres treated for each of the vegetation types showed that most acres (60,118) were treated for broadleaf weeds, followed by grassy weeds (46,607 acres), woody plants (31,115 acres), no vegetation (2132 acres), and general herbaceous plants (267 acres) (Fig. 2).

Estimated application cost per acre per growing season was divided into five categories: 1) $0.00 - $25.00, 2) $25.01 - $50.00, 3) $50.01 - $100.00, 4) $100.01 - $150.00, and 5) >$150.00. Most cost estimates (26) were in the highest cost category (>$150.00), and all of these applications were on woody plants (Fig. 3). Twenty-three estimates fell in the lowest cost category ($0.00 - $25.00), ten of which were on grassy weeds although all vegetation types received applications. Eighteen estimates fell in the $100.00 - $150.00 category, and most of those (11) were for woody plants. Sixteen estimates fell in the $50.01 - $100.00 category, and half of those were for woody plants. Nine estimates fell in the $25.01 - $50.00 category with nearly half (4) of the applications on woody plants.

Application methods used by respondents included high/low volume spray, basal bark treatment, stump/cut stubble treatment, broadcast pelleted products, and aerial. The most used application method was the high/low volume spray. Estimated cost for high/low volume spray application was variable, but most applications were the lowest cost of all types (Table 1). Most basal bark treatments were estimated to be more than $150.00 per acre per growing season. Two stump/cut stubble treatments were estimated to cost $100.01 - $150.00 (Accord) and more than $150.00 (Access) per acre per growing season. Only one broadcast pelleted product (Spike) was estimated at more than $150.00 per acre per growing season. Most aerial treatments were estimated to cost more than $100.00 per acre per growing season.

Twenty-nine products were listed by survey respondents as being used for vegetation management. These are listed alphabetically by trade name in Table 2 and by common name in Table 3. A listing of trade and common names together is found in Appendix B. According to survey respondents, the most commonly used products in terms of frequency reported are Arsenal, Accord, Roundup, and Garlon, comprising 13.5, 12.5, 11.5, and 10.4 percent (respectively) of total usage (Table 2). Consequently, the most frequently used active ingredients were glyphosate (Accord, Roundup) at 24.2 percent, imazapyr (Arsenal) at 13.7 percent, and triclopyr (Garlon) at 10.5 percent (Table 3). However, several herbicides were less frequently reported but encompassed significantly large acreages. These herbicides included 2, 4-D applied to 26,863 acres, MSMA applied to 16,018 acres, Telar applied to 14,848 acres, Escort applied to 10,838 acres, and Fusion applied to 9,779 acres (Table 2). Together, these five herbicides were applied to almost 68 percent of the reported acreage. The following is an alphabetical listing by trade name of the herbicides reported in this survey:

2, 4-D is a selective, hormone-type, systemic phenoxy herbicide used for postemergence control of primarily broadleaf weeds. One respondent reported using 2, 4-D for broadleaf weeds as a high/low volume spray at a rate of 2 quarts per acre at a cost of $5.01 to $10.00 per acre. No alternative controls were listed.

Access is composed of two active ingredients, picloram and triclopyr, and is used for controlling woody plants in forests, rights-of-way, and noncrop areas. Two reports of usage were on woody plants as a basal bark treatment and as a stump/cut stubble treatment at unknown rates. Cost of application was estimated at more than $150.00 per acre.

Table 1. Frequency of five application methods used by survey respondents according to five categories of cost/acre/growing season.

Application Method	$0.00-$25.00	$25.01-$50.00	$50.01-$100.00	$100.01-$150.00	>$150.00	Totals
High/Low Volume Spray	23	8	15	13	13	**72**
Basal Bark Treatment	0	0	1	0	7	**8**
Stump/Cut Stubble Treatment	0	0	0	1	1	**2**
Broadcast Pelleted Products	0	0	0	0	1	**1**
Aerial	0	1	0	4	4	**9**
Totals	**23**	**9**	**16**	**18**	**26**	**92**

Figure 1. Frequencies of pesticide treatments on five types of right-of-way vegetation.

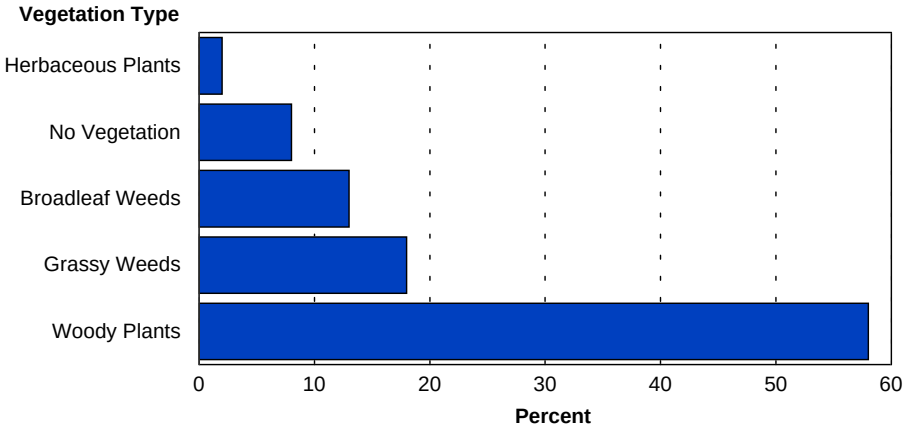

Figure 2. Total acres of five right-of-way vegetation types receiving pesticide treatments.

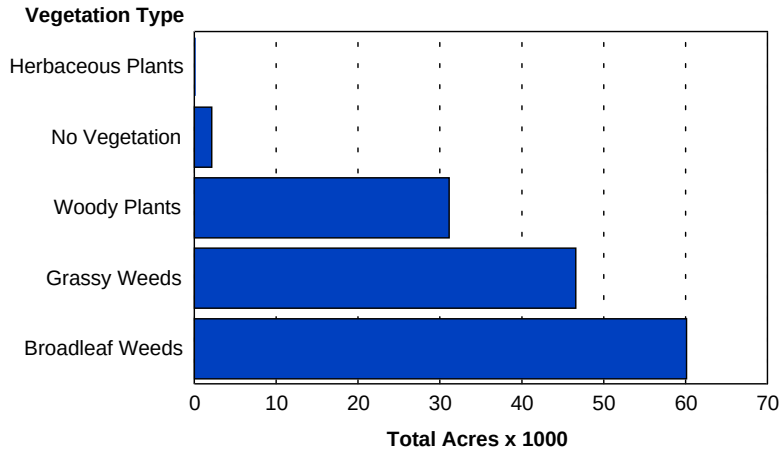

Figure 3. Frequencies of estimated application cost per acre for a growing season (includes cost of herbicide(s), equipment and labor) by vegetation type.

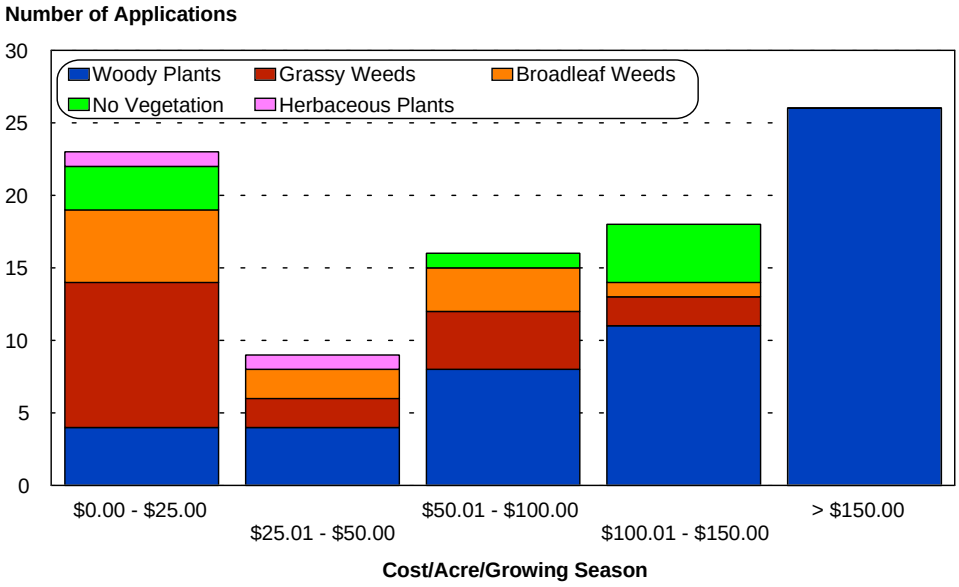

Table 2. Alphabetical listing of trade names of herbicides used by survey respondents with frequency of usage (F), percentage of total usage (PF), acres treated (A) and percentage of total acres (PA).

TRADE NAME	F	PF	A	PA
2, 4-D	1	1.0	26,863	23.2
Access	2	2.1	----	----
Accord	12	12.5	4051	3.5
Arsenal	13	13.5	7011	6.1
BK 800	1	1.0	420	0.4
Can-Trol	3	3.1	<1	<0.1
Embark	1	1.0	3696	3.2
Endurance	4	4.2	64	<0.1
Escort	5	5.2	10,838	9.4
Event	1	1.0	2909	2.5
Fusilade 2000	1	1.0	1584	1.4
Fusilade DX	1	1.0	145	0.1
Fusion	1	1.0	9779	8.5
Garlon	10	10.4	2555	2.2
Horizon	1	1.0	1696	1.5
Hyvar	1	1.0	<2	<0.1
Karmex	5	5.2	42	<0.1
Krenite	3	3.1	1724	1.5
MSMA	1	1.0	16,018	13.9
Oust	4	4.1	301	0.3
Pendulum	1	1.0	1671	1.4
Roundup	11	11.5	7643	6.6
Spike	2	2.1	110	0.1
Surflan	1	1.0	89	<0.1
Telar	1	1.0	14,848	12.8
Tordon	3	3.1	1061	0.9
Transline	2	2.1	437	0.4
Vanquish	3	3.1	5	<0.1
Velpar	1	1.0	<2	<0.1

Mechanical control was listed as an alternative control method with no rating.

Accord and **Roundup** (glyphosate) are nonselective, postemergence, systemic herbicides that are used for control of annual and perennial weeds, woody brush, and trees. Respondents reported that Accord was used mostly for woody plant control at rates ranging from more than 3 1/2 to 10 quarts per acre at costs ranging from $60.01 to more than $150.00 per acre. Typically, a single application was made as a high/low volume spray. Other application methods were stump/cut stubble treatments and aerial. Roundup was used by respondents for various vegetation types, including woody plants, grassy and broadleaf weeds, and herbaceous plants. Rates ranged from 8 ounces per acre for grassy and broadleaf weeds to 8 quarts per acre for grassy weeds. Costs ranged from $15.01 to $130.00 per acre. Typically, one or two applications were made as a high/low volume spray. Alternative control measures for both chemicals were mechanical, which is a less effective measure of control.

Arsenal (imazapyr) is a non-selective, broad-spectrum, systemic herbicide with residual activity. It is used to control annual and perennial grasses, broadleaf weeds, and woody species. Arsenal was used by respondents on 7,011 acres, mostly for woody plant control as a single high/low volume spray or aerial application. Rates ranged from 6 to 24 ounces per acre at costs ranging from $15.01 to more than $150.00 per acre. Alternative control measures are mechanical, which is a less effective measure of control.

BK 800 (2, 4-D + 2, 4-DP + dicamba) had a single report of a high/low volume spray for woody plants at 1 1/2 gallons per acre at a cost of $60.01 to $70.00 per acre. No alternative controls were listed.

Can-Trol (MCPB BWK-98) is a herbicide used for postemergence selective weed control. Three reports listed use as a single high/low volume spray for grassy and broadleaf weeds and woody plants at an unknown rate costing $140.01 to $150.00 per acre. Mechanical control was listed as a less effective alternative. This product was discontinued in 1993.

Embark (mefluidide) is a plant growth regulator used to suppress seedhead formation and vegetative growth of grasses. One respondent listed use for grassy weeds with a high/low volume spray at 8 ounces per acre costing $5.01 to $10.00 per acre. No alternatives were listed.

Endurance (prodiamine) is a selective preemergence herbicide used for industrial vegetation management. Three reports of usage were for grassy and broadleaf weeds and woody plants as single high/low volume sprays at 9.6 ounces per acre costing $60.01 to $70.00 per acre. Mechanical control was listed as a less effective alternative. One report listed usage on no vegetation (bare ground) as a high/low volume spray at 2 pounds per acre costing $0.00 to $5.00 per acre. No alternatives were listed.

Escort (metsulfuron-methyl) is a selective sulfonylurea herbicide used for postemergence control of most broadleaf weeds and some annual grass weeds. Most respondents reported using Escort for woody plant control, but a large acreage of broadleaf weeds was also listed. Escort was used as a high/low volume spray at rates of 1/4 ounce per acre for broadleaf weeds and at 1/4 ounce to 4 ounces per acre for woody plants. Cost per acre ranged from less than $5.01 to more than $150.00. Alternative control measures listed for woody plant control are mechanical, which is a less effective measure of control.

Event (imazethapyr + imazapyr) was reported as a single use for seedhead suppression of grasses as a high/low volume spray at a rate of 4 ounces per acre costing $5.01 to $10.00 per acre. No alternatives were listed.

Table 3. Alphabetical listing of common names of herbicides used by survey respondents with frequency of usage (F) and percentage of total usage (P).

COMMON NAME	F	P
2, 4-D	1	1.1
Bromacil	1	1.1
Chlorsulfuron	1	1.1
Clopyralid	2	2.1
Dicamba-DGA	3	3.2
Diuron	5	5.3
Fenoxaprop-P-ethyl + Fluazifop-P-butyl	2	2.1
Fluazifop-P-butyl	2	2.1
Fosamine Ammonium	3	3.2
Glyphosate	23	24.2
Hexazinone	1	1.1
Imazapyr	13	13.7
MCPB BWK-98	3	3.2
Mefluidide	1	1.1
Metsulfuron-methyl	5	5.3
MSMA	1	1.1
Oryzalin	1	1.1
Pendimethalin	1	1.1
Picloram	3	3.2
Picloram + Triclopyr	2	2.1
Prodiamine	4	4.2
Sulfometuron-methyl	3	3.2
Tebuthiuron	2	2.1
Tree Growth Regulator	2	2.1
Triclopyr	10	10.5

Fusilade 2000/Fusilade DX (fluazifop-P-butyl) is a selective, postemergence grass herbicide. Two reports listed high/low volume sprays for grassy weeds. Fusilade 2000 was used at 24 ounces per acre costing $5.01 to $10.00 per acre, and Fusilade DX was used at 12 ounces per acre costing $10.01 to $15.00 per acre. No alternatives were listed.

Fusion/Horizon 2000 (fluazifop-P-butyl & fenoxaprop-P-ethyl) is a benzoxazole phenoxy herbicide used for annual and perennial grass weeds. Two respondents reported using Fusion and Horizon 2000 for grassy weeds as a high/low volume spray at a rate of 8 ounces per acre at a cost of $5.01 to $10.00 per acre. No alternative controls were listed.

Garlon (triclopyr) is a systemic herbicide used for controlling woody plants and broadleaf weeds. It was used by respondents to control woody plants by typically using a single high/low volume spray, basal bark treatment, or aerial application. Rates ranged from 2 to 12 quarts per acre at costs ranging from $25.01 to more than $150.00 per acre. Alternative control measures are mechanical, which is a less effective measure of control.

Hyvar (bromacil) is a uracil herbicide used for weed and brush control in noncrop areas. One respondent used Hyvar to control woody plants with two basal bark treatments at an unknown rate costing more than $150.00 per acre. Mechanical control is listed as a less effective alternative.

Karmex (diuron) is a substituted urea herbicide used against emerging and young broadleaf and grass weeds. Karmex was used by respondents on a variety of vegetation types as well as no vegetation (bare ground), typically as a single high/low volume spray at 2 to 6 pounds per acre costing $60.00 to $150.00 per acre. Mechanical control is less effective.

Krenite (fosamine ammonium) is a brush control agent and growth regulator used on woody plants as well as some broadleaf weeds. Respondents used Krenite on woody plants typically as a high/low volume spray or aerial application at rates ranging from 6 quarts to 2 1/2 gallons per acre costing less than $5.00 to more than $150.00 per acre. Mechanical control is listed as a less effective alternative.

MSMA is an organic arsenical herbicide used for postemergence control of primarily grassy weeds as well as a few broadleaf weeds. The one respondent reporting use of MSMA used it as a high/low volume spray for grassy weeds at a rate of 1/3 gallon per acre at a cost of $5.01 to $10.00 per acre. No alternative controls were listed.

Oust (sulfometuron-methyl) is a herbicide used to control many grasses and annual broadleaf weeds in noncropland areas. Respondents typically used Oust in no vegetation (bare ground) situations as a high/low volume spray at rates ranging from 1/2 to 4 ounces per acre costing from less than $5.00 up to $150.00 per acre. No alternative controls were listed.

Pendulum (pendimethalin) is a dinitroaniline herbicide with selective preemergence activity. One respondent used Pendulum for a high/low volume spray on no vegetation (bare ground) at a rate of over 6 1/2 pounds per acre costing $0.00 to $5.00 per acre. No alternatives were listed.

Spike (tebuthiuron) is a herbicide used on noncropland areas, rangelands, rights-of-way, and industrial sites. Respondents used Spike as a single-application broadcast pelleted product or aerial application for woody plant control at a rate of 15 pounds per acre costing $35.01 to more than $150.00 per acre. Mechanical control is listed as a less effective alternative.

Surflan (oryzalin) is a dinitroaniline herbicide with selective, preemergence activity against annual grasses and broadleaf weeds. One respondent used Surflan as a no vegetation (bare ground) high/low volume spray at 1 1/3 gallon per acre costing $80.01 to $90.00 per acre. No alternatives were listed.

Telar (chlorsulfuron) is a selective sulfonylurea herbicide used mostly for control of broadleaf weeds but also some

grasses. The one respondent reporting use of Telar used it for broadleaf weeds as a high/low volume spray at a rate of 1/4 ounce per acre at a cost of less than $5.01 per acre. No alternative controls were listed.

Tordon (picloram) is a systemic herbicide used for controlling a wide variety of deep-rooted broadleaf weeds and woody plants. Some products contain picloram/2, 4-D mixtures. Respondents used Tordon as a high/low volume spray or aerial application for woody plant control at rates ranging from 20 ounces to 1 1/4 gallon per acre costing $110.00 to more than $150.00 per acre. Mechanical control methods are listed as less effective alternatives.

Transline (clopyralid) is a herbicide used for selective postemergence control of broadleaf weeds. Respondents used Transline as a high/low volume spray to control grassy and broadleaf weeds at a rate of 1 pint per acre costing $30.01 to $35.00 per acre. No alternative controls were listed.

Vanquish (dicamba-DGA) is a substituted benzoic acid herbicide used for weed control in turf and noncropland sites. Respondents used Vanquish as a single high/low volume spray for broadleaf and grassy weeds and woody plants at a rate of over 25 1/2 ounces per acre costing $60.01 to $70.00 per acre. Mechanical control is listed as a less effective alternative.

Velpar (hexazinone) is a contact and residual nonselective herbicide for use on noncropland areas. One respondent used Velpar for two basal bark treatments for woody plants at an unknown rate costing more than $150.00 per acre. Mechanical control is listed as a less effective alternative.

Summary

The Kentucky Pesticide Impact Assessment Program conducted a mail survey in early 1997 to learn more about specialized herbicides and plant growth regulators used on rights-of-way in Kentucky. It is critical to gain a better understanding of pesticide usage in this area to learn what chemicals are necessary for vegetation management and to support re-registration efforts. Other concerns associated with right-of-way pesticide applications are worker health and safety and pesticide movement to nontarget areas. Objectives of this project were to determine what pesticides are used on rights-of-way, what pests are targeted, what rates and number of applications are normally used, what alternatives to pesticides exist and how they compare and to acquire data that may help support re-registration efforts. This survey project was supported by the Vegetation Management Association of Kentucky with their assistance in questionnaire development and use of their mailing list of vegetation managers. Eighteen usable responses were received from the original group of 46 vegetation managers, resulting in a 39 percent response rate. In terms of number of treatments, woody plants received the most pesticide applications of the five vegetation types listed in the questionnaire. In terms of total acres, broadleaf weeds were the most targeted pest. Most estimates of application costs were in the highest cost category of more than $150.00 per acre per growing season, and all of these applications were for woody plants. The most used application method was a high/low volume spray. Twenty-nine products were listed by survey respondents as being used for vegetation management. The most commonly used products in terms of frequency reported were Arsenal, Accord, Roundup, and Garlon comprising 13.5, 12.5, 11.5, and 10.4 percent (respectively) of total usage. These herbicides comprised 47.9 percent of the usage. In terms of acreage treated, the most used products were 2, 4-D, MSMA, Telar, Escort, and Fusion. Together, these five herbicides were applied to almost 68 percent of the reported acreage.

References

Green, J.D., J.R. Hartman, M.P. Johnson, J.E. Primus, D.L. Spatcher and W.C. Wheeler Jr. 1996. Training Manual for Right-of-Way Vegetation Management. University of Kentucky Cooperative Extension Service publication PAT 1-6. Lexington, KY.

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Appendix A

Survey Cover Letter

Survey Questionnaire

Follow-up Letter

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
Lexington, Kentucky 40506-0091

COOPERATIVE EXTENSION SERVICE

RESIDENT INSTRUCTION
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE

ENTOMOLOGY
S-225 Ag. Science Bldg.-North
(606) 257-5955
FAX: (606) 323-1120

January 9, 1997

Dear Vegetation Management Foreman/Manager:

Enclosed you will find a questionnaire concerning pesticide usage on rights-of-way and other vegetation management situations. The primary goal of the survey is to gain an overall assessment of the benefits gained from correct use of pesticides. This project is supported by the United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CSREES) and the University of Kentucky Cooperative Extension Service. This project is also supported by the Vegetation Management Association of Kentucky (VMAK). The VMAK Advisory Board has provided valuable assistance in organizing this survey.

There is a strong possibility that pesticide assessment people at Virginia Tech University will be conducting the same survey of vegetation managers in Virginia. Therefore, the final report for this project may be a joint effort with results from Virginia compared with Kentucky's.

The results of this survey will have an effect on the total benefit/risk analysis of pesticides currently being done jointly by the USDA and the Environmental Protection Agency (EPA). The information that you furnish through this questionnaire will be incorporated into final decisions on whether a given pesticide is critical to vegetation management or not.. Further, it could have a bearing on whether or not a pesticide will be cancelled.

Responses to this survey will be anonymous and non-traceable in the final report. We sincerely appreciate your time and effort to participate in this survey. Your input is critical to the success of this project. PLEASE RETURN THE SURVEY QUESTIOINNAIRE IN THE ENCLOSED SELF-ADDRESSED AND STAMPED ENVELOPE **BY FEBRUARY 28, 1997.**

Sincerely,

Monte P. Johnson
Extension Specialist

Enclosure

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin.

UNIVERSITY OF KENTUCKY, KENTUCKY STATE UNIVERSITY, U.S. DEPARTMENT OF AGRICULTURE, AND KENTUCKY COUNTIES, COOPERATING

Kentucky Pesticide Use Survey: 1996
Right-Of-Way Vegetation Management

- This questionnaire is supported by the USDA Extension Service and The Cooperative Extension Service of the Commonwealth of Kentucky. Its main goal is to gain an overall assessment of the benefits gained from the correct use of pesticides.

- The results of this survey will have an effect on the total benefit/risk analysis of pesticides currently being done jointly by the USDA and EPA. As right-of-way vegetation managers, you are familiar with the problems encountered when controlling vegetation along roadways and under utility lines, as well as many other special situations. Consequently, you know the types and importance of herbicides and plant growth regulators (PGRs) used, the recommended rates, methods of application, number of treatments, and any alternative control measures available. This information will be incorporated into the final decisions on whether a given pesticide is critical to vegetation management or not. Further, it could have a bearing on whether or not a pesticide use will be cancelled.

- Make duplicates of pages if you need more.

- Make copies of this survey for your own records.

- You are asked to list types of vegetation that you managed and the herbicides/PGRs used during the past growing season (1996).

- The first entry on the answer sheet is an example of how to fill it out.

- Responses to this survey will be anonymous and non-traceable in the final report.

- If you have any questions, please contact: Monte P. Johnson, Telephone: (606)257-6693, Department of Entomology, S-225 Agriculture Science Center North, University of Kentucky, Lexington, KY 40546-0091

PLEASE RETURN THIS QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED, STAMPED ENVELOPE BY FEBRUARY 29, 1997

Kentucky Pesticide Use Survey: 1996
Right-Of-Way Vegetation Management

Reference Sheet for Vegetation Type, Application Methods, Pesticide Application Costs per Acre per Growing Season, Alternative Control (AC) Examples, and Rating of Alternative Controls. Please use the letters, numbers, and symbols to represent your answers on the answer sheet.

Vegetation Type:
G=Grassy Weeds
B=Broadleaf Weeds
W=Woody Plants
H=Herbaceous Plants
N=No Vegetation
(Bare Ground)

Application Method:
1=High/Low Volume Spray
2=Basal Bark Treatment
3=Stump/Cut Stubble Treatment
4=Broadcast Pelleted Products
5=Banding/Strip Treatment
6=Hypo Hatchet/Tree Injector
7=Aerial

Pesticide Application Costs Per Acre for a Growing Season:

A=$0.00-$5.00
B=$5.01-$10.00
C=$10.01-$15.00
D=$15.01-$20.00
E=$20.01-$25.00
F=$25.01-$30.00
G=$30.01-$35.00
H=$35.01-$40.00
I=$40.01-$45.00
J=$45.01-$50.00
K=$50.01-$60.00
L=$60.01-$70.00
M=$70.01-$80.00
N=$80.01-$90.00
O=$90.01-$100.00
P=$100.01-$110.00
Q=$110.01-$120.00
R=$120.01-$130.00
S=$130.01-$140.00
T=$140.01-$150.00
U=Over $150.00

Alternative Control Examples:
Biological: Animals, birds, competing plants
Mechanical: Hoeing, mowing, pruning, etc.
Burning
Flooding

Rating of These Controls:
- = less effective
0 = no change
+ = more effective

Kentucky Pesticide Use Survey: 1996
Right-Of-Way Vegetation Management

Please make copies of this page if more entries are needed.

Vegetation Type	Herbicide/ PGR	Acres Treated	Applica-tion No.	Application Method	Typical per Acre Rate	Typical per Acre Cost	Alternative Control (AC)	AC Rating
W	Roundup	10	1	1	4 quarts	P	Mechanical	--

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
Lexington, Kentucky 40506-0091

COOPERATIVE EXTENSION SERVICE

RESIDENT INSTRUCTION
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE

ENTOMOLOGY
S-225 Ag. Science Bldg.-North
(606) 257-5955
FAX: (606) 323-1120

March 14, 1997

Dear Vegetation Management Foreman/Manager:

About two months ago, you should have received a questionnaire packet concerning pesticide usage on rights-of-way. **IF YOU HAVE RECEIVED THE PACKET AND RESPONDED, THANK YOU SO MUCH - PLEASE DISREGARD THIS MESSAGE.** If you have not responded, please consider filling out the answer sheet and returning it to us. Results of this survey will have an effect on pesticide assessments conducted by USDA and EPA and your input is a very critical part of this process. Without knowledge of what pesticides are necessary for vegetation management, benefits of these materials may go unnoticed.

Please complete and return the survey as soon as is practical. Your participation in this project is sincerely appreciated. If you did not receive the questionnaire packet, please give us a call at (606)257-6693 so we can check your address and send you another. **THANK YOU VERY MUCH!**

Sincerely,

Monte P. Johnson

Monte P. Johnson
Extension Specialist
Department of Entomology
University of Kentucky

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin.

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Appendix B

Pesticide Trade Names

Common Names (Active Ingredient(s))

Manufacturers

Signal Word

Restricted Use Product Designation (RUP)

Trade Name	Common Name	Manufacturer	Signal Word	RUP
2, 4-D	2, 4-D	Several	Varies by form	No
Access	Picloram + triclopyr	DowElanco	Caution	Yes
Accord	Glyphosate	Monsanto	Caution	No
Arsenal	Imazapyr	American Cyanamid	Caution	No
BK 800	2, 4-D + 2, 4-DP +dicamba	PBI/Gordon		
Can-Trol	MCPB BWK-98	Rhone-Poulenc		
Embark	Mefluidide	PBI/Gordon	Caution	No
Endurance	Prodiamine	Sandoz Agro	Caution	No
Escort	Metsulfuron-methyl	DuPont	Caution	No
Event	Imazethapyr + imazapyr	American Cyanamid		
Fusilade 2000 Fusilade DX	Fluazifop-P-butyl	Zeneca	Caution	No
Fusion	Fluazifop-P-butyl & fenoxaprop-P-ethyl	Zeneca	Caution	No
Garlon	Triclopyr	DowElanco	Caution/Danger	No
Horizon	Fluazifop-P-butyl & fenoxaprop-P-ethyl	AgrEvo USA	Caution	No
Hyvar	Bromacil	DuPont	Caution	No
Karmex	Diuron	DuPont	Warning	No
Krenite	Fosamine ammonium	DuPont	Warning	No
MSMA	MSMA	Drexel	Caution	No
Oust	Sulfometuron-methyl	DuPont	Caution	No
Pendulum	Pendimethalin	American Cyanamid	Caution	No
Roundup	Glyphosate	Monsanto	Caution	No
Spike	Tebuthiuron	DowElanco	Caution	No
Surflan	Oryzalin	DowElanco	Caution	No
Telar	Chlorsulfuron	DuPont	Caution	No
Tordon	Picloram	DowElanco	Warning	Yes
Transline	Clopyralid	DowElanco	Caution	No
Vanquish	Dicamba-DGA	Sandoz Agro	Caution	No
Velpar	Hexazinone	DuPont	Danger	No

Glossary

Absorption—Uptake (in this context, of a pesticide) by plants, animals including humans, micro-organisms, or soil.

Acid Equivalent—The amount of active ingredient in a pesticide formulation (e.g., an ester) expressed in terms of the acid from which it is derived; this figure is used in determining application rate.

Active Ingredient—The chemical in a pesticide product that is responsible for the pesticidal effects.

Adjuvant—A material added to a pesticide formulation to increase its effectiveness or aid in the application process.

Adsorption—The binding of a pesticide to surfaces (e.g., soil particles) by physical or chemical action.

Amine Salt—A pesticide formulation in which an acid is neutralized by an amine, a basic compound.

Annuals—Plant that die after only one growing season and that reproduce by seed.

Application Rate—The amount of pesticide applied to a site, usually expressed as a liquid or dry measure per unit area; for example, pounds or pints per acre.

Basal Bark Treatment—An application to the woody stems of plants at or just above the ground line and including the root crown.

Biennials—Plants that live for two growing seasons; in the first season, they form a low vegetative “rosette”; in the second season, they flower, produce seed, and die.

Biological Control—Suppression of a pest population by its own natural enemies, such as predators or parasites.

Chemical Control—Suppression of a pest population by use of a pesticide.

Contact Herbicide—A herbicide that kills plants primarily by contact with plant tissues rather than as a result of translocation; only the part actually touched by the herbicide is affected.

Dicot (Dicotyledon)—A plant with two cotyledons or seed leaves; a broadleaf plant with net-like leaf venation.

Emulsifying Agent—A material that helps suspend one

liquid in another with which it would not mix otherwise.

Emulsion—A dispersion of fine particles of oil in water.

Ester—An organic salt; an acid neutralized with an alcohol.

Extender—A material added to a herbicide formulation to extend its activity and effectiveness.

Foliar—Relating to the leaves or foliage of plants; e.g., a foliar spray is applied to the foliage.

General Use Pesticide—A pesticide that can be purchased and used by any responsible person.

Herbaceous Plants—Plants that do not form a woody stem.

Herbicide—A phytotoxic chemical used for killing or inhibiting the growth of plants.

Hypo-hatchet—An instrument used to inject a pre-measured amount of herbicide directly into the growing woody stem.

Invert Emulsion—A dispersion of water in oil having a mayonnaise-like consistency.

Leaching—The movement of pesticides downward through the soil with water.

Mechanical Control—Control of vegetation by hand-pulling, hoeing, blading, mowing, cutting, pruning, burning, bulldozing, cropping, or other nonchemical and nonbiological methods.

Microfoil Boom—A boom that has a specially designed nozzle that forms large, viscous spray particles to minimize drift.

Monocot (Monocotyledon)—A plant having a single cotyledon or seed leaf and narrow leaves with parallel veins.

Perennials—Plants that live for three or more seasons and reproduce by seed and/or vegetative parts, such as bulbs, tubers, rhizomes, stolons, or roots.

Persistence—In this context, a measure of how long a pesticide remains in an active form at the site of application or in the environment.

Pesticide—Any substance or mixture of substances intended to prevent, destroy, control, repel, attract, or mitigate any pest.

pH—A value expressing the acidity or alkalinity of a solution on a scale of 1 to 14; the neutral point is 7.0, below 7 is acid, and above 7 is alkaline.

Phenoxy—A chemical class of herbicides including 2, 4-D.

Phytotoxicity—Injury to plants due to exposure to a chemical.

Restricted Use Pesticide—A pesticide that can legally be purchased and used only by or under the supervision of a certified applicator.

Rhizomes—Lateral extensions of plant stems beneath the soil.

Right-of-way—An area involved in common transport.

Safener—A substance which prevents objectionable changes when two or more substances must be mixed which otherwise would not be compatible.

Selectivity—The characteristic of herbicides whereby certain plant species are killed while others are injured little if at all.

Soil Sterilant—A chemical that prevents the growth of any organism in the soil—plants, animals, or microorganisms; the effect may be temporary or long-lasting, depending on the chemical.

Spray Disc—In aerial application, a revolving disc mounted under the spraying ship whereby the herbicide mixture is spread across the right-of-way by centrifugal force of the revolving disc.

Spray Drift—The physical movement of spray particles and/or vapors off the target area at the time of application.

Stolons—Lateral extensions of plant stems along the surface of the soil.

Stump Treatment—Herbicide applied to cut stumps or stems to prevent suckering or re-sprouting.

Sulfonylurea—A chemical class of herbicides which includes chlorsulfuron, metsulfuron, and sulfometuron.

Surfactant—An adjuvant which improves the emulsifying, dispersing, spreading, and/or wetting properties of a pesticide.

Translocated Herbicide—Herbicide which when applied to one part of a plant (leaves or roots) can be taken up by the plant and moved internally to another part of the plant.

Tree Growth Regulator (TGR)—A chemical which in small amounts alters the growth habits of trees.

Triazine—A chemical class of herbicides which includes atrazine and prometon.

Uracil—A chemical class of herbicides which includes bromacil.

Urea—A chemical class of herbicides which includes diuron.

Volatilization—The movement of particles of a liquid pesticide after it has been converted into a vapor, usually occurring at some time after application.

Woody Plants—Plants that live longer than two years and have a thick, tough stem or trunk covered with cork.

Note: *Trade names are used to simplify information in this publication no endorsement is intended, nor is criticism implied of similar products that are not named.*

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