

ROADSIDE VEGETATION MANAGEMENT EQUIPMENT AND TECHNOLOGY

Annual Report For FFY 2011
ODOT SP&R ITEM NUMBER 2156

Submitted to:

John Bowman, P.E.
Planning and Research Division Engineer
Oklahoma Department of Transportation
200 N.E. 21st Street
Oklahoma City, Oklahoma 73105

Submitted by:

Doug Montgomery, M.S.
Craig Evans, M.S.
Dennis Martin, Ph.D., Principal Investigator
Oklahoma State University
Department of Horticulture & Landscape Architecture
358 Agricultural Hall
Stillwater, OK 74078



December 2011

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources.

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views of the Oklahoma Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. While trade names may be used in this report, it is not intended as an endorsement of any machine, contractor, process, or product.

MODERN METRIC CONVERSION FACTORS*

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in²	square inches	645.2	square millimeters	mm ²
ft²	square feet	0.093	square meters	m ²
yd²	square yard	0.836	square meters	m ²
A	acres	0.405	hectares	ha
mi²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft³	cubic feet	0.028	cubic meters	m ³
yd³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in²	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm²	square millimeters	0.0016	square inches	in ²
m²	square meters	10.764	square feet	ft ²
m²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	A
km²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m³	cubic meters	35.314	cubic feet	ft ³
m³	cubic meters	1.307	cubic yards	yd ³
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

TABLE OF CONTENTS

<u>TEXT SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION.....	1
2.0 UPDATE ON THE MANUFACTURING AND AVAILABILITY OF BOOMBUSTER SPRAY TIPS.....	1
3.0 UPDATE ON THE EPA REGISTRATION STATUS OF MSMA HERBICIDE PRODUCTS AND THEIR USE ON OKLAHOMA ROADSIDES.....	2
4.0 THE NEW EPA NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PESTICIDE GENERAL PERMIT	3
5.0 UPDATE ON THE IMPRELIS HERBICIDE (aminocyclopyrachlor) TREE DAMAGE COMPLAINTS AND POSSIBLE AFFECTS ON FUTURE USE OF PERSPECTIVE™ OR STREAMLINE™ HERBICIDES	5
6.0 REVIEW OF NEW ODOT LIQUID DRIFT CONTROL ADDITIVE USES AND BENEFITS	6
7.0 REFERENCES.....	7
 <u>LIST OF FIGURES</u>	
Figure 1. Boomless Boombuster 437-R roadside spray tip showing the nylon diffuser	1
Figure 2. Quart containers of Control™ Deposition Aid/Drift Retardant and Corral® Poly Drift Control Agent and Deposition Aid.....	7

1.0 INTRODUCTION

As in the past, the focus of this report continues to be the conveyance of information on new or previously underutilized technologies and resources that have application to the Oklahoma Department of Transportation's (ODOT) roadside vegetation management program. ODOT administrators and supervisors deal with many highway maintenance challenges. They have opportunities to use new technologies that can increase efficiency or effectiveness of vegetation management programs. As part of ODOT's contract with the Oklahoma State University Roadside Vegetation Management (OSU RVM) program, OSU personnel participate in the annual Southern Weed Science Society, and National Roadside Vegetation Management Association (NRVMA), and semi-annual Oklahoma Vegetation Management Association meetings. Additionally, OSU RVM personnel make many personal contacts with industry representatives each year in order to gather information on RVM technologies and stay abreast of industry happenings. OSU personnel also continually review many on-line and hard copy trade journals, magazines, and news releases that may have information about old and new roadside vegetation management items. The OSU RVM Program and its connection to the land-grant university system allow a unique opportunity for recommendations to ODOT regarding new applicable resources generated by other universities.

2.0 UPDATE ON THE MANUFACTURING AND AVAILABILITY OF BOOMBUSTER SPRAY TIPS

For many years ODOT has relied on the Boombuster spray tip (Figure 1) to accurately deliver its broadcast herbicide applications to Oklahoma roadsides. The Boombuster spray tip comes in a range of sizes to fit any roadside application scenario. While the Boombuster tip is made out of durable stainless steel it does have a nylon diffuser that produces the arc-shaped pattern. The nylon diffuser is very wear tolerant but as with any nylon component it is subject to wear as well as photodegradation from sunlight. Under normal use the nylon diffuser will last for at least 3-4 spray seasons (longer if not stored in direct sunlight) before their surface becomes discolored, cracked, chalky-colored, and in need of refurbishing or replacement.



Figure 1. Boomless Boombuster 437-R roadside spray tip showing the nylon diffuser.

The original manufacturer of the Boombuster spray tip, Evergreen Products of Millen, Georgia, was a very small family-run company lead by Mr. Franklin Rabitsch, with only a few employees. Two years ago a co-principal in the company, Mrs. Rabitsch, passed away. This was followed by another principal, Mr. Franklin Rabitsch, having health problems. During the 2010 spray season the company fell behind in their production of spray tips, creating product availability problems that lasted well into the 2011 spray season. Additionally, during the last two years it had become very difficult to get Boombuster spray tips refurbished by the manufacturer. In May of 2011, Evergreen Products, Inc. was purchased by Bear River Industries of Richmond Hill, Georgia. As of June of 2011 the new owners had caught up on supplying the demand for all new orders of Boombuster spray tips. At that time they announced a plan to increase both production and refurbishing of Boombuster tips in the future. Bear River Industries will continue to distribute the Boombuster spray tips through wholesale distributors only. Our closest wholesale distributor in Oklahoma continues to be Wylie Spray Center, 5820 SW 11st Street, Oklahoma City, Oklahoma 73128 (phone: 888-665-5538 or 405-946-4896, FAX: 405-949-2055). Current Wylie Boombuster spray tip prices as of October 1, 2011 are as follows: Boombuster 437R = \$122.20, 375R = \$115.03, 260-11R = \$109.80, and 180-6R = \$98.84 per tip. Old spray tips with bad nylon diffusers can be sent back to the manufacturer for refurbishing for approximately one half of the cost of the purchase price of a new tip. This cost also includes shipping. The new company owners say they will try to have a two week turnaround on refurbishing of old tips. The new manufacturer requests that old tips be sent directly back to the manufacturer at the following address: Bear River Industries, 9898 Ford Avenue, Richmond Hill, GA 31324 (phone: 912-756-5599). As of 9 December 2011 Bear River Industries did not yet have a web site but their representatives' state that they have plans for one in the near future.

3.0 UPDATE ON THE REGISTRATION STATUS OF MSMA HERBICIDE PRODUCTS AND THEIR USE ON OKLAHOMA ROADSIDES

MSMA continues to be a beneficial herbicide in ODOT johnsongrass control programs and has been since the early 1970's. MSMA was the standard johnsongrass control treatment on Oklahoma roadsides prior to the advent of glyphosate and its tank mixes with sulfonyleurea herbicides. While MSMA use has declined significantly over the years it is still used by several ODOT Field Divisions each summer. MSMA is currently used by ODOT for field sandbur, johnsongrass, and broadleaf weed control. As reported to ODOT in the 2007 ODOT Herbicide Program Report, EPA was in the process of denying the reregistration of many uses of MSMA herbicides. While EPA was initially looking at mandatory MSMA cancellations, the effort quickly evolved into a voluntary cancellation by MSMA manufacturers. There is a significant difference in regulations and restrictions between an herbicide that is under a mandatory cancellation versus one that is under voluntary cancellation.

Starting in 2009 and continuing over the next several years there is a scheduled voluntary phase out of MSMA use on most traditional use sites. By December 31, 2010

consumer purchase of MSMA for use in residential situations was discontinued with an allowance for use on residential sites until those stocks are gone. As of the time of production of this report MSMA products labeled for use on roadsides, golf courses and sod farms will not be allowed to be sold after December 31, 2012 and all applications of MSMA products labeled for roadside, golf course and sod farm use must end by December 31, 2013. Unless the current EPA voluntary phase out procedure changes by January 1, 2014 it will be illegal to use MSMA for weed control on any and all roadsides, golf courses and sod farms.

Due to the current regulations, ODOT should be careful about managing warehouse supplies of MSMA products and to make sure not to carry over any MSMA past the December 31, 2013 deadline. ODOT should plan on using up all inventories of MSMA products by July or August of 2012.

Notably during the summer and fall of 2011 a national grassroots effort to save roadside use of MSMA was undertaken by some industry leaders. The grassroots effort consisted mainly of a request to all vegetation managers to submit letters of MSMA reregistration support to Tom Myers of the US EPA. The effort provided sample letters from the Organic Arsenicals Task Force that could be modified or customized before being sent to Mr. Myers. The goal of that effort was to get a large amount of support letters returned in a relatively short amount of time. MSMA use in cotton was saved by a similar support letter writing campaign and industry representatives are hopeful that the same effort will work to save MSMA use on roadsides and other areas. OSU personnel will continue to monitor this issue and report to ODOT as new information is available. EPA decisions on future roadside use of MSMA are expected during the first quarter of 2012.

4.0 THE NEW US EPA NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PESTICIDE GENERAL PERMIT

For the past forty years herbicide use has been regulated at the federal level by the Federal Insecticide, Fungicide, and Rodenticide Act of 1972 (FIFRA). The enforcement agency charged with oversight enforcement of this Act is the US EPA. As of November 1, 2011 an additional Federal Act will also regulate pesticide use. This second act covering pesticide use is the Clean Water Act (CWA) by way of the National Pollutant Discharge Elimination System (NPDES) Pesticide General Permit (PGP) program. The new regulatory jurisdiction of the CWA is due to a 2009 decision by the U.S. Sixth Court of Appeals (*National Cotton Council, et al. v. EPA*) in which the court overruled a 2006 EPA decision and found that point source discharges of biological pesticides, and chemical pesticides that leave a residue in the waters of the U.S. were pollutants under the CWA. As a result of this decision, for ODOT to continue to make broadcast herbicide applications to roadsides, they will be required to obtain an NPDES Pesticide General Permit. Oklahoma is one of six states that will use the EPA-generated Pesticide General Permit as Oklahoma chose not to develop and issue NPDES pesticide permits at the state level. So within the borders of Oklahoma, any pesticide

applications regulated under the CWA will need to be covered by PGP obtained through the EPA. While the permit requirements must be met as of October 31, 2011, ODOT will be covered automatically under the PGP without submitting a Notice of Intent (NOI) for any discharges before January 12, 2012. To continue coverage after January 12, 2012, ODOT will be required to submit a Notice of Intent (NOI), and will need to do so at least 10 days (or 30 days for discharges to National Marine Fisheries Service (NMFS) Listed Resources of Concern) prior to January 12, 2012. For the first 120 days that the permit is in effect, EPA will focus on providing compliance assistance and education of the permit requirements, rather than on enforcement actions. It should also be noted that before ODOT can submit an NOI, they must have a written Pesticide Discharge Management Plan in place.

The proposed requirements of the Clean Water Act (NPDES) were presented to ODOT during the 2010 ODOT Pesticide Applicator Continuing Education Workshops. The details and requirements of the new NPDES PGP are far too numerous to list and discuss in this report. However, if the new requirements remain permanent, it will have a substantial impact on ODOT herbicide programs across the state. The new NPDES PGP requirements have not been well-received by the pesticide manufacturing, sale or use industries. Many people in these industries feel that FIFRA regulations are adequate in regulating pesticide use. Many feel that the NPDES PGP is not only duplicative regulations but too restrictive and time consuming in meeting its requirements. All efforts by legislators, pesticide industry representatives, and pesticide users thus far have failed in getting pesticides exempted from the CWA. These efforts continue and hopefully in the near future we can report to ODOT that in fact pesticides have been exempted. Currently it appears that ODOT will need to comply with the new NPDES PGP requirements. EPA's Final Pesticide General Permit was posted to the web on October 31, 2011 and can be downloaded and viewed, along with examples of other NPDES forms and documents, from the following web site.

<www.epa.gov/npdes/pesticides>

It should be noted that EPA has mandated that all NPDES forms and documents must be filed on-line. Those choosing not to file on-line are subject to additional regulations to justify their filing choices.

As ODOT personnel read through the requirements of the NPDES PGP, Notice of Intent, and Pesticide Discharge Management Plan, they will quickly learn that all applicants will be held to a new level of documentation and accountability. Most of the activities that will have to be reported under the NPDES PGP are currently either required by state law and/or have been recommended for documentation by OSU RVM personnel for many years. Bringing ODOT herbicide programs into compliance with the NPDES will require additional time, personnel, and possibly funds. OSU RVM personnel are available to consult with ODOT personnel and assist ODOT in their efforts to comply with the CWA. Along with the majority of the pesticide manufacturing and use industry we will continue to hope that pesticide applications can ultimately be exempted from the CWA. OSU RVM personnel will continue to monitor and report upon the CWA and its application to pesticide use.

5.0 UPDATE ON THE IMPRELIS™ HERBICIDE (aminocyclopyrachlor) TREE DAMAGE COMPLAINTS AND POSSIBLE AFFECTS ON FUTURE USE OF PERSPECTIVE™ OR STREAMLINE™ HERBICIDES

In August of 2010 a new Dupont herbicide named Imprelis™ (active ingredient: aminocyclopyrachlor) received its federal and state registrations for use in turfgrass weed control programs. Imprelis™ herbicide is not labeled for roadside use but is of particular interest to ODOT because its singular active ingredient is one of two active ingredients in the new Perspective™ and Streamline™ herbicides. The new Dupont Perspective™ and Streamline™ herbicides were labeled in early 2011 for roadside use but too late for wide-scale inclusion in this year's herbicide programs. Based on research results from the ODOT SPR 2157 project, OSU project personnel were in a position to make final use recommendations to ODOT maintenance personnel later this year.

Aminocyclopyrachlor is readily absorbed by plant leaves and roots (1, 2). Also, because of its persistent nature it can remain active in the soil ready for plant uptake for several months after applying appropriate labeled rates. This active ingredient is also well known for its activity on brush species. Even some very hard to control species like mesquite are susceptible to aminocyclopyrachlor. During the spring of 2011 problems quickly arose soon after the first applications of Imprelis™ were made on golf courses, home lawns, and commercial turf areas in several northern states. After Imprelis™ was applied (apparently consistent with labeled directions) to turf areas, some evergreen tree species growing within the treated areas began showing damage. In particular, Norway spruce and white pine seemed to be especially susceptible to Imprelis™/aminocyclopyrachlor (3, 4, 5). Multiple states and law suits were filed against Dupont in late spring and early summer of 2011 (6). On August 11, 2011 the EPA issued a Stop-sale, Stop Use, and Removal Order to Dupont for the Imprelis™ herbicide (7). This was quickly followed by Dupont voluntarily suspending sales of Imprelis™ herbicide and conducting a product return and refund program (8). This is an unprecedented event as far as new herbicides are concerned and is unfortunate for many reasons. Removal of Imprelis™ due to off-target effects may affect future use of products that contain the aminocyclopyrachlor active ingredient such as Perspective™ and Streamline™ herbicides. The Imprelis™/aminocyclopyrachlor situation has been monitored closely by OSU personnel and questions have been posed to Dupont representatives as whether modifications to Perspective™ or Streamline™ herbicides uses can be expected. Initial responses from Dupont representatives were that no changes/restrictions to the Perspective™ or Streamline™ labels and uses were expected as a result of the 2011 Imprelis™ tree damage issue. However in early November 2011, OSU was notified by Dupont representatives that there would indeed be new EPA-approved labels for Perspective™ and Streamline™ herbicides that include new precautionary statements. At the time of the development of this report the new label statements were not available for review by OSU personnel. The new Perspective™ and Streamline™ labels are estimated for final EPA-approval and release in February 2012.

The Imprelis™ tree damage issue has been well publicized and it will be important to continue to monitor public opinion concerning aminocyclopyrachlor herbicide use. The new Dupont aminocyclopyrachlor active ingredient is also scheduled for 2012 EPA registration for use in pasture and rangeland for weed and brush control under a different trade name than that used for roadside products. While all of these new Dupont aminocyclopyrachlor herbicides are entering the market under heightened public scrutiny, it is important that potential end users remember that these same herbicides also provide some very desirable weed and brush control. As with all herbicide risk/benefit scenarios, OSU RVM Project Personnel are available for consultation with ODOT maintenance personnel.

6.0 REVIEW OF NEW ODOT LIQUID DRIFT CONTROL ADDITIVE USES AND BENEFITS

During the 2011 OSU compatibility testing effort, the Control™ Deposition Aid/Drift Retardant used at a rate of 1.0 oz./100 gallons of water, proved to be compatible with all herbicides and herbicide combinations tested (Figure 2). The Corral® Poly Drift Control Agent and Deposition Aid used at a rate of 2.0 oz./100 gallons of water, was compatible with all herbicide and herbicide combinations tested with one exception (Figure 2). When Prodiamine 65 WDG was combined with the Corral® Poly adjuvant, moderate to severe physical incompatibilities occurred. The physical incompatibilities were in the form of moderate to severe flocculation (*flocculation means to cause dispersed particles to mass in a group*) followed by settling and eventually the formulation of a heavy mass of large flocculated particles. Prodiamine 65 WDG is a dry herbicide formulation that when added to water will disperse and form a homogeneous suspension provided that normal tank agitation is occurring. However, if agitation is marginal or not existent, settling of the dispersed particles will occur. Once settled, re-suspension may be difficult but can usually be achieved with adequate agitation over several minutes. The incompatibility that occurred in this test between Prodiamine 65 WDG and Corral® Poly at 2.0 oz/100 gallon carrier rate appeared to irreversibly change the ability of Prodiamine 65 WDG to remain properly dispersed in water. The severity of the incompatibility would likely cause clogging of sprayer components such as 50 mesh screens, electric shut-off valves, electric pressure control valves and small spray tips. This would likely affect the proper distribution of this herbicide during the application.



Figure 2. Quart containers of Control™ Deposition Aid/Drift Retardant and Corral® Poly Drift Control Agent and Deposition Aid.

Considering the positive tank mix compatibility results, the OSU-RVM Program formally recommend that both Control™ and Corral® Poly (with the Prodiamine 65 WDG use restriction) be included on the *2011 ODOT Approved Herbicide & Adjuvant List (AHAL)*. Because of the resulting incompatibilities between Prodiamine 65 WDG and Corral® Poly, at the 2 oz./100 gallon of water carrier rate, we cannot recommend that ODOT use Prodiamine 65 WDG herbicide with Corral® Poly. However, it can be effectively used with all other herbicides and herbicide combinations tested. After Control™ and Corral® Poly were added to the AHAL, it was then decided to add each of these products to the upcoming ODOT Herbicide Contract renewal set for November of 2011. Each of these products should be added as a separate contract item; specifications for each of these products vary slightly which should facilitate separation on the contract. Consequently, this should allow each field division to choose which product they prefer based on both price and whether the product will need to be used with Prodiamine 65 WDG in their division. OSU personnel are available to assist field division personnel with guidance on their 2011/2012 drift control product purchases. Another benefit of having both products on contract is having alternative drift control products in case availability of the alternative product became an issue. At the time of development of this report, the cost per acre of these products was yet to be determined. However, it seems reasonable to project that ODOT field divisions will see a reduced cost per acre based on the much lower use rates of these products. Control™ has a use rate of 1 oz. & Corral® Poly has a use rate of 2 oz./100 gallons of water compared to Detain II at 8-12 oz./100 gallons of water. Because of the lower use rates, ODOT crews will be adding much smaller quantities of their chosen drift control product into the tank (pints per tank load instead of quarts per tank load). This should make handling and mixing of the new products much easier and quicker. It is important to note that the short shelf life of the old Detain II drift control additive was 6 months and due to the carry-over of unused product from year-to-year product expiration was a persistent concern. The new products have a

shelf-life of at least 1 year and this should extend the usable life of the product and reduce the problem with product separation of older products.

7.0 REFERENCES

1. DuPont. 2009. DPX-MAT28 Technical Bulletin. E.I. du Pont de Nemours and Company.
2. Bukun BR, Lindenmayer B, Nissen SJ, Westra P and Shaner DL. 2010. Absorption And Translocation of Aminocyclopyrachlor And Aminocyclopyrachlor-Methyl Ester In Canada Thistle (*Cirsium arvense*). *Weed Sci* 58:96–102.
3. Creswell, Tom, Ruhl, Gail, Patton, Aaron, and Weller, Steve. 2011. A Homeowners Guide to Imprelis Herbicide Injury in the Landscape. Purdue Plant & Pest Diagnostic Laboratory Fact Sheet, September 2011.
4. Prostack, Randall, Owen, Mary, and Lanier, Jason. 2011. Turf Herbicide Damage to Trees and Shrubs. Agriculture & Landscape Program, Turf Program, Turf Management Update, July 7, 2011. University of Massachusetts, Amherst.
5. Landschoot, Pete. 2011. Some Observations on Imprelis Injury to Trees. PennState, College of Agriculture Sciences, Penn State Extension, Green Industry Education Committee News, June 26, 2011
6. Class Plaintiffs vrs. E.I. Dupont Nemours and Company. 2011. *In re: Imprelis Herbicide Marketing, Sales Practices and Products Liability Litigation*, Case No.11-md-2284 (E.D.Pa.), transferred to the United States District Court for the Eastern District of Pennsylvania, Philadelphia, judge Gene E.K. Pratter.
7. Ferdas, Abraham, Land and Chemicals Division, EPA. 2011. Stop Sale, Use, or Removal Order, EPA Docket NO: FIFRA-03-2011-0277SS. United States Environmental Protection Agency, Region III, 1650 Arch Street, Philadelphia, Pennsylvania 19103-2029.
8. McDermott, Michael, Global Business Leader, Dupont Professional Products. 2011. August 4, 2011 Letter to Turf Management Product Distributors. Dupont Professional Products, 4417 Lancaster Pike, Chestnut Run Plaza 705, Wilmington, DE 19880-0705.