FINAL REPORT ~ FHWA-OK-18-03

IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

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Oklahoma Department of Transportation

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IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

FINAL REPORT ~ FHWA-OK-18-03
ODOT SP&R ITEM NUMBER 2156 TASK 1

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16. ABSTRACT

Initial pesticide applicator training schools, certification testing, sprayer calibration workshops and on-going yearly continuing education sessions comprise the herbicide applicator training program of the Oklahoma Department of Transportation (ODOT). Six pesticide applicator certification schools were conducted by Oklahoma State University (OSU) extension staff in early 2018 to train a total of 97 ODOT participants. Ninety-one of the attendees at these workshops passed the Core exam (93.8% pass rate). Of these 91 staff, 79 staff passed the category 6 right-of-way exam (86.8% pass rate). Overall, 79 of 97 staff that participated in the 2018 certification training schools passed both the core and category 6 exams yielding an 81.4% overall success rate in producing category 6 certified applicators in spring of 2018. In spring 2018, 616 ODOT staff were provided with pesticide applicator continuing education training at 13 on-site workshops and 3 additional applicators received ceu training in one webinar in August 2018. Records of ODOT personnel participating in the CEU programs were furnished to ODAFF as well as the ODOT Field Division training representatives. Participants gained CEU credits and knowledge on various Integrated Pest Management (IPM) and Integrated Vegetation Management (IVM) topics including plant identification, contemporary pesticide issues, pesticide fate, meso-scale weather monitoring, as well as suggested products/programs for roadside weed and brush control. Increased knowledge of the participants should insure continued effective vegetation management skills.

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SI* (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		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	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/in^2	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		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	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/m^2	$candela/m^2$	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. (Revised March 2003)

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1.0 INTRODUCTION

The Oklahoma Department of Transportation (ODOT) continues use of an integrated roadside vegetation management (IRVM) program to provide cost-effective management of vegetation on roadside right-of-way [8]. This effort involves proper vegetation selection, installation and post-installation management. After vegetation installment, management involves selective mowing and weed control [8] and occasional re-establishment on a limited basis. The ability to properly select and apply herbicides for right-of-way weed control is a technical skill that is not taught in primary or secondary school. This specialized training is not otherwise available to ODOT through any current in-house training, nor through the normal non-contractual services provided by the Oklahoma Cooperative Extension Service.

In 1995 ODOT developed the Herbicide Program Policy Directive D-504-1 [10]. The Directive includes requirements that all personnel applying herbicides must be Certified Pesticide Applicators complying with requirements administered by the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). The Directive [10] also requires anyone involved in herbicide application is required to attend an annual training program pertinent to vegetation management.

Because of Directive D-504-1 and the fact that there is some turnover in ODOT field staff, an on-going pesticide applicator training and certification effort is necessary for new applicators. The annual continuing education workshops are necessary not only due to this directive but also due to changes in state and federal rules/regulations, new herbicide product development, new pesticide application equipment, product patent expiration and subsequent generic product offerings, changes in industry product marketing agreements, changes in products being awarded the state competitive bid contract, and lastly, evolving weed problems.

2.0 OBJECTIVES

1. To conduct yearly herbicide applicator certification schools that will help prepare new ODOT personnel for subsequent pesticide applicator testing and certification.
2. To incorporate a testing date by ODAFF at the end of each certification school or provide the program just in advance of a near-by testing opportunity.
3. To provide each of the eight ODOT Field Divisions with yearly herbicide applicator continuing education (CEU) workshops.

3.0 BACKGROUND AND SIGNIFICANCE OF WORK

For the past 32 years, annual pesticide applicator certification schools have been conducted on an “as-needed” basis as a part of the joint roadside vegetation management and training projects between ODOT and Oklahoma State University (OSU). These schools provide timely initial training of ODOT personnel attempting to become Oklahoma Certified Pesticide Applicators.

Under Task 1 in our FY2018 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation,* we proposed to continue to offer these schools which help prepare ODOT personnel for the rigors of two 100 question exams that must be passed for ODOT personnel to become certified in Oklahoma Category 6 (Right-of-Way). Certification in Category 6 (Right-of-Way) qualifies the applicator for use of pesticides for public road maintenance, power line maintenance, railroad right-of-way, storage tank areas, and other similar areas [9]. Certification in Category 5 (Aquatic) qualifies the applicator for treatment of weeds in standing or running water in man-made and/or natural impoundments, streams, etc. [9]. Category 6 certification excludes public health activities (e.g. mosquito control) and water in totally closed systems.

ODOT Field Divisions have hosted yearly CEU workshops in Category 6 (Right-of-Way) for the last 32 years. We proposed and were contracted to conduct these continuing education (CEU) workshops under Task 1 in our FY2018 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation.* These workshops have annually supplied current and vital information to approximately 650 Certified Applicators in ODOT each year. There may continue to be a need for some applicators to also obtain training in Oklahoma Category 5 (Aquatic Pest Control). This is due to the fact that some applicators need to treat aquatic sites located on lands managed by ODOT.

4.0 PURPOSE

The purpose of the Pesticide Applicator Certification schools was to train participants to understand the basics of integrated pest management (IPM) as well as to become Certified Applicators by passing the designated tests. After gaining a fundamental understanding of IPM and becoming a Certified Applicator, the individual is usually ready to be given specific assignments by in-house ODOT mentors. Trainees are prepared to be successful at managing vegetation and weeds on Oklahoma roadsides. The initial Pesticide Applicator Certification prepares the new Certified Applicators for participation in annual pesticide applicator continuing education (CEU Workshops) so that they can comply with ODOT policy as well as maintain their certification in Oklahoma. Also, the initial training prepares the new applicator for herbicide application equipment calibration workshops offered by the OSU RVM program under Task 4 of the Project 2156 proposal.

5.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND STUDENT TESTING

5.1 PREPARATIONS FOR FEDERAL FY2018 CERTIFIED APPLICATOR SCHOOLS

Division and Maintenance Engineers were contacted by phone and email in fall of 2017 and winter of 2018 to estimate i) the number of participants for winter/spring 2018 certification schools as well as ii) determine suitability of proposed specific training dates and locations of training. During this same time period representatives of the Oklahoma Department of Agriculture, Food & Forestry (ODAFF) were contacted to determine the availability of personnel to administer the Oklahoma Certified Pesticide Applicator core and category specific applicator exams at training sites. Due to short-staffing at ODAFF, we utilized the standard 2018 testing sites established by ODAFF and we offered certification schools just in advance of these established testing dates. Upon receiving approval by ODOT Field Division Maintenance Engineers, Area Maintenance Engineers/Managers and Field Division Training Representatives, the dates, times and locations of the six certification schools were set. The necessary information was provided in emails sent in January – March 2018 to these individuals and a Project 2156 contact list. Additionally, emails were sent to the Division Maintenance leaders and Training Representatives in order to secure two training documents for their participants using the 2018 order form for Pesticide Applicator Certification Manuals from Oklahoma State University Central Mailing Services via the internet at: http://pested.okstate.edu. The email also contained information explaining the *Oklahoma Pesticide Laws & Rules* manual is no longer available for order and must now be downloaded and printed from the following website http://www.oda.state.ok.us/forms/cps/cpl.pdf or picked up at the ODAFF Headquarters in Oklahoma City. The specific training materials to be acquired by the Divisions for their personnel were i) *Applying Pesticides Correctly* (Revised November 2012), ii) the Category 6: *Right-of-Way Study Guide* (Revised July 2009) and iii) the *Oklahoma Pesticide Laws & Rules* (Revised September 11, 2017).

5.2 PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Six Pesticide Applicator Certification Schools were presented to ODOT staff in winter/spring of 2018. These Federal FY 2018 Schools were conducted on February 2 and 5 Kiamichi Tech Center (McAlester); February 15-16 Division 4 Headquarters (Perry); February 15-16 Division 3 Headquarters (Ada); March 6-7 NE Campus of Tulsa Community College; March 7-8 Burns Flat Career Tech Center (Burns Flat); April 9-10 Division 7 Headquarters (Duncan). The number of participating ODOT staff at the certification school locations was a total of 97 participants. The 97 ODOT staff trained in the initial certification schools in FY2018 compares with a total of 84 ODOT participants in Federal FY2017 [1], 100 in FF2016 [7], 79 in FY2015 [6], 103 in FY2014 [5], and 128 in FY2013 [4].

The first and second day of each of the six schools were conducted from 8:30 a.m. to 3:30 p.m. The schools were held using a classroom-style set up. Presentation of information was via an oral lecture using Smart Board peripheral display technology (SMART Technologies, Calgary, AB T2L 1Y1, Canada), Microsoft Power Point visual aids, and printed handouts. Participants were encouraged to ask questions during the lecture. A question and answer segment were provided immediately following each topic lecture. Instructors for the schools were Ms. Caroline Nelson, B.Sc., Extension Educator, Dr. Andrea Payne, Ph.D., Extension Educator, Mr. Jimi Underwood, M.Sc., Extension Educator and Dr. Dennis Martin, Ph.D.

5.3 SPECIFIC TOPICS OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Topics included in each of the six ODOT Certified Applicator Schools were: integrated pest management (IPM), IPM terminology, state and federal rules and regulations, pest identification, mechanical and cultural pest management strategies, understanding pesticide labels and safety data sheets (SDS), personal protective equipment (PPE), pesticide selection, pesticide application techniques, spray system technologies, environmental protection, application recordkeeping, proper pesticide storage and disposal and how to obtain pesticide applicator continuing education. These topics were drawn from the three key training manuals that Division and/or Maintenance Engineers had acquired for their employees in advance of the training. The training included and was consistent with the information in the three training manuals discussed under section 5.1 of this report. OSU personnel also handed out copies of supplemental information that would be useful to ODOT personnel as they assumed their roll in ODOT vegetation management activities following initial certification as Oklahoma Pesticide Applicators.

5.4 APPLICATOR TESTING AND ACHIEVEMENT OF CERTIFICATION

Following each school, a pesticide applicator testing site and date was used by ODOT staff to test in the Core category as well as in Category 6 (right-of-way). Pesticide applicator testing was conducted at the designated test sites from 9:00 a.m. - 12:00 p.m. by representatives of the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). ODOT personnel first took the core exam [9] which consisted of a multiple-choice written exam containing 100 questions. ODAFF representatives then scored the participants' core exam. Personnel that passed the core exam were next allowed to take the 100-question multiple choice written category specific exam [9]. The category specific exam of most interest to ODOT was the Category 6 (Right-of-Way) exam. However, in some years there are ODOT personnel that also take the Category 5 (Aquatic Weed Control) exam. It is important to note that while applicators have access to category 5 training manuals, we did not (nor did we in the past) provide a category 5 overview as was performed for the core and category 6 materials over the 2-day school.

Passing the core exam and category specific exam is required in order to become a Certified Pesticide Applicator in Oklahoma [9]. In past years ODAFF representatives sent OSU-RVM representatives applicators test scores and assigned

certified applicator numbers of the newly passed applicators. As ODAFF did not provide the information in 2018, a work-around was conducted by OSU-RVM staff to discover which of the certification school attendees had become certified pesticide applicators in Oklahoma using ODAFF's on-line records hosted by Kelly Solutions. For the purposes of success rate calculations, we assumed that all applicators that participated in the certification schools eventually took the certified applicator tests. Of the 97 participants in the six certification schools conducted in 2018, 91 passed the exam for a 93.8% overall pass rate on the core exam. Ninety-one people tested for certification in category 6 (right of way) while 79 people passed that exam yielding an 86.8% pass rate. Some of the personnel that took the category 6 exam had passed the core exam but failed their category 6 exam at an earlier workshop and retook the exam at a later workshop during the 2018 schools. Overall, 79 of 97 people eventually passed both the core and category 6 exams yielding an eventual 81.4% overall success rate in producing category 6 right-of-way certified applicators. The 81.4% overall pass rate for those wanting to become certified right-of-way applicators in the FY2018 certification schools compares with 63.9% in FY2017 [1], 69% in FY2016 [7], 68% in FY2015 [6], 79% in FY2014 [5], 79% in FY2013 [4], 93% in FY2012 [3], and 86% in FY2011 [2].

5.5 POST-TESTING NOTICE OF CERTIFICATION OF PERSONNEL

Unlike past years, following the testing of ODOT employees, ODAFF was unable to provide the test scores and notification of achievement of certification in the Right-of-Way category to OSU RVM program personnel. This was due to short-staffing at ODAFF. OSU personnel developed a work-around using the Kelly Solutions interface and was able to search on-line certification records using the applicators first and last name. The applicator's certified applicator number and proof of certification was downloaded and the information was provided to the applicator's respective training representative at the ODOT Division level.

5.6 POST-TESTING RECORDKEEPING AT OKLAHOMA STATE UNIVERSITY

Ms. Caroline Nelson, Dr. Andrea Payne, and Mr. Jimi Underwood entered the applicator names, ODOT employee number, employee Certified Applicator number, Division of employment, date of testing, and categories of certification into our certified pesticide applicator database. This database is maintained under the Task 2 Objective: *Maintain Pesticide Applicator Training Records for ODOT Certified Pesticide Applicators,* as a part of the Joint Project 2156: *Roadside Vegetation Management Training & Consultation.* The database will be accessed in the future to confirm that ODOT staff participated in past workshops. This information is needed for both ODOT training representatives, ODOT certified pesticide applicators and also as evidence in helping ODOT certified applicators obtain corrections to their records held by the ODAFF.

6.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CONTINUING EDUCATION (CEU) WORKSHOPS

6.1 PESTICIDE APPLICATOR CONTINUING EDUCATION WORKSHOPS

Thirteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted on-site in FY2018. A special CEU webinar was offered for three ODOT applicators on August 23rd for a total of two CEUs as these individuals were not able to attend previously scheduled workshops. The locations, dates and attendance at each of the workshops are shown in Table 1. The workshops were approved by ODAFF as programs OK20180376, OK20180377, OK20180378, OK20180379, and OK20180380. Attendees at on-site workshops were each awarded five pesticide applicator CEUs in Category 6 (Right-of-way) and those applicators certified in category 5 (Aquatic weed control) received one ceu in category 5 for attending presentation OK20180377. The training agenda for the CEU programs is shown in Table 2. The instructors varied by location for the CEU Workshops, but consisted of Dr. Andrea Payne, Extension Program Educator; Ms. Caroline Nelson, Extension Program Educator; Mr. Jimi Underwood, Extension Program Educator; and Dr. Dennis Martin, Professor & Vegetation Management Extension Specialist.

Participant numbers were anticipated to be high enough that two workshops were conducted in each Division with one exception. Although participate numbers in Divisions 5 were high enough to conduct two workshops, a single workshop was conducted which combined Divisions 5 and 6. A total of 619 ODOT staff participated in the 14 Herbicide Applicator CEU workshops (13 on-site, 1 webinar) offered by ODOT/OSU under FFY 2018 SP&R Project 2156. The 619 Certified Pesticide Applicators trained in the FY2018 CEU workshops compare with 665 in FY2017 [1], 656 in FY2016 [7], 642 in FY2015 [6], 637 in FY2014 [5], 640 in FY2013 [4], 610 in FY2012 [3], and 605 in FY2011 [2]. The number of applicators receiving continuing education in FFY2018 represents a 6.9% decrease over FF2017 numbers, which had increased 1.4% over the FFY2016 attendance.

6.2 CEU AWARDING AND POST WORKSHOP RECORDKEEPING

Attendance records of participants in the ODAFF approved CEU programs were supplied to ODAFF so that attendees could be awarded CEUs by ODAFF. Attendance records were also supplied to the Division Training contacts in each ODOT Division. Our records of attendance maintained under Task 2 of Joint Project 2156 were updated to reflect the participation of the 619 applicators in the 2018 CEU workshops and webinar.

7.0 SUMMARY AND CONCLUSIONS

Six pesticide applicator certification schools were conducted during February through April 2018 in order to train a total of 97 participants. Of the 97 people trained at the schools, 91 people eventually passing the exam (93.8% pass rate). Ninety-one

attendees tested for certification in right of way at the test sites and 79 of the 91 people taking the category 6 right-of-way test passed, yielding an 86.8% pass rate. Overall 81.4% of the school's attendees passed both the core and right of way exam to become certified applicators in category 6 right of way in Oklahoma. Records of testing and success were provided to each Division's designated training representative.

Thirteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted across a total of eight ODOT Field Divisions in the months of February through early April of 2018. On August 23rd a two-hour webinar offered through the WebEx system helped three ODOT applicators earn ceus. A total of 619 ODOT staff received continuing education training in these 13 workshops and one webinar. Copies of workshop sign-in sheets for each workshop were furnished to the designated training representative in each ODOT Field Division following completion of each workshop. Continuing education credits were granted to those ODOT employees who were certified prior to 2018 (as per ODAFF rules) that participated in the 2018 CEU Workshops. Certified applicators are not eligible to earn ceus in the same year in which they become certified applicators but they can still learn from the presentations offered. ODOT participants gained knowledge on various Integrated Pest Management and Integrated Vegetation Management products, topics and techniques. This increased or maintained operational knowledge of attendees should insure continued effective vegetation management skills. This training is believed to be essential in delivery of cost-effective vegetation management on Oklahoma roadsides.

As of May 2018, the OSU-RVM program maintained records of more than 800 ODOT staff who were certified pesticide applicators that have attended ODOT/OSU CEU Workshops since the start of the current right-of-way certification period in 2015. These records are available to the ODAFF and ODOT under the terms of the current Joint 2156 ODOT/OSU Project.

Table 1. 2018 ODOT Herbicide Applicator Continuing Education (CEU) Workshop Schedule and Attendance.[1]

CEU Workshop Dates	Day of Week	ODOT Division	Location	Attendance by Division
March 27	Tuesday	5 and 6	Woodward High Plains Technology Center	Division 5 – 95 Division 6 – 39
March 28 - 29	Wednesday - Thursday	2	Antlers HQ	Division 2 – 49/27
April 11 - 12	Wednesday - Thursday	3	Ada HQ	Division 3 – 29/35
April 18 - 19	Wednesday - Thursday	1	Muskogee HQ	Division 1 – 46/42 Division 3 – 0/3
April 23 - 24	Monday - Tuesday	7	Duncan HQ	Division 7 – 42/31 Division 3 – 3/6 Division 5 – 0/3
April 26 - 27	Thursday - Friday	3	Perry HQ	Division 4 – 31/44 Division 3 – 9/0 Division 8 – 0/1
May 2 - 3	Wednesday - Thursday	8	Tulsa HQ	Division 8 – 39/38 Division 3 – 1/0 Division 4 – 0/3
Aug 23	Thursday		Oklahoma State University at Stillwater	Division 5 – 1 Division 7 – 2
			Total[1]	619

[1] The 619 total attendance tally represents the total number of current ODOT employees who participated in the 14 pesticide applicator continuing education workshops.

Table 2. Agenda for the 2018 Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter

8:35 a.m. Sign-in and Welcome / OSU Roadside Vegetation Management Team

8:35 to 9:30 a.m. What's that Plant: Grass and Broadleaf Identification in Right-of-Way
This presentation will be devoted to the basic identification of the most common desirable and undesirable plants in right-of-way (use site areas under category 6) in Oklahoma. Plant material images will be presented in a Power Point presentation. Tips for taking and sending proper digital images for plant ID will briefly be covered. The presentation focuses on key leaf shape, floral characteristic and overall growth habit useful in identification of common roadside plants will be shown to attendees. This presentation offers a high level of audience interaction as the speaker quizzes the audience concerning the ID of the plant image being shown prior to revealing its actual identity by common name. Attendees will be provided with information needed to download or place orders for some of the more common plant ID guides such as Weeds of the West, and White-tail Deer: Their Food and Management in the Cross Timbers as well as use the Noble Foundation's on-line guide to common Oklahoma plants that are found in right-of-ways and rangeland/pasture.

9:30 to 9:40 a.m. Break

9:40 to 10:35 Using the Oklahoma MESONET Pesticide Drift Risk Advisor for Proper Selection of Application Conditions
This presentation will cover concepts of spray droplet size in relation to risk of wind drift, drift risk by high wind speeds vs suspension in air inversion layers, spray droplet dispersion conditions, choosing proper dispersion conditions for herbicide application and use of the Oklahoma MESONET system for choosing suitable atmospheric conditions for proper application conditions. New features of the MESONET for applicators and a brief overview about the free MESONET Phone application will be discussed.

10:35-10:45 a.m. Break

10:45 to 11:40 Understanding Herbicide Fate: Reducing Herbicide Runoff and Leaching Fates in the Roadside Environment
This presentation will review the carious fates of herbicide from the time spray droplets leave the nozzle, through the atmosphere on their way to the target plants as well as the various fates of herbicide once it arrives on the plant or the soil surface and thereafter. Fates to be included in the discussion are: wind drift, vapor drift/volatilization, droplet roll-off, leaf penetration, translocation, pesticide leaching, pesticide runoff, sunlight degradation, microbial decomposition, and soil binding/inactivation. Special emphasis will be given to herbicide runoff and leaching fates in this presentation as well as recognizing conditions conductive to these fates and how to avoid them when making herbicide applications to roadsides.

11:40 a.m. to 12:40 p.m. Lunch

Table 2. (Continued) Agenda for the 2018 Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter

12:40 to 1:35 pm Herbicide Products, Labels and Industry Update
A review of the current status of dicamba herbicide products, glyphosate herbicide products as well as the current status of restrictions on MSMA labeling/usage will be featured in this presentation. Illustrations of damage from dicamba use in the crop production industry will be reviewed so that lessons can be learned and applied to the right-of-way environment ODOT uses diglycolamine salt of dicamaba (production Vanquish) similar to the formulations used by farmers in the dicamba resistant soybean and cotton environment. Bayer Environmental Science had discontinued production of Perspective herbicide (active ingredients aminocyclopyrachlor plus chlorsulfuron), Streamline (active ingredients imazapyr, aminocyclopyrachlor and metsulfuron methyl) herbicides that are used in right-of-way. Registration of these products will remain in effect until all stock is used up. Bayer will continue the manufacture and sale of Method 240 Soluble Liquid (active ingredient aminocyclopyrachlor) herbicide, a more recent introduction, to the right-of-way market. Brand names as well as generic formulations of both Escort XP (active ingredient metsulfuron methyl) and Telar XP (active ingredient chlorsulfuron) and imazypyr will remain available. We will discuss recreation of the labeled herbicide pre-mixes with appropriate tank-mixes and the fit of these herbicides in roadside weed control programs in Oklahoma.

1:35 to 1:45 pm Break

1:45 to 2:40 pm Roadside Weed Control Programs
This presentation will discuss the most commonly used winter annual weed control programs, the summer annual broadleaf control program, the summer johnsongrass control program, and a fall-applied winter annual pre-emergent weed control programs in right-of-ways in Oklahoma. Proper herbicide production selection, adjuvant selection, herbicide rate/adjuvant rate, and key applications caveats will be discussed. The proper plant ID, product/adjuvant selection along with use rates, proper timing and weather conditions insure successful weed control and minimize risk of injury to bermudagrass or causing other off-target environmental issues.

8.0 REFERENCES

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