

**2006 Report on
Roadside Vegetation Management
Equipment & Technology**

**Developed Under Joint Project 2156: Section 8
Between the Oklahoma Department of
Transportation
and the Oklahoma State University**

By

Craig Evans
Extension Associate

Doug Montgomery
Extension Associate

and

Dr. Dennis Martin
Extension Turfgrass Specialist

Oklahoma State University
360 Agriculture Hall
Stillwater, OK 74078-6027

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.

Oklahoma State University, U. S. Department of Agriculture, State and Local governments cooperating. 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 and state 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, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources. 12/2006.

TABLE OF CONTENTS

| <u>Section</u> | <u>Page</u> |
|---|--------------------|
| 1.0 Introduction..... | 1 |
| 2.0 ACR Sales ATV/Utility Vehicle Bracket | 2 |
| 3.0 ACR Sales ATV/Utility Vehicle Bracket Summary with Recommendations..... | 2 |
| 4.0 Calc-An-Acre Astro II GPS Speed Sensor..... | 3 |

List of Figures

| | |
|---|---|
| Figure 1. Image of ACR Sales ATV/Utility Vehicle Bracket mounted to Honda 4-Wheeler. | 4 |
| Figure 2. Image of ACR Sales ATV/Utility Vehicle Bracket assembled prior to vehicle mounting. | 5 |
| Figure 3. Images of ACR Sales ATV/Utility Vehicle Bracket Assembly..... | 6 |
| Figure 4. Images of ACR Sales ATV/Utility vehicle bracket and Speidel Wiper boom mounting on ATV..... | 7 |

1.0 Introduction

The objective of this report is to provide Oklahoma Department of Transportation (ODOT) personnel with recommendations concerning the utilization of new technologies and/or adaptations of existing technology. This will enable vegetation managers to comply with ODOT's need to provide safe travel corridors for Oklahoma's motoring public.

In recent years, Oklahoma agricultural producers have been exploring the production of non-traditional, high value crops to circumvent the low returns per acre from traditional crops such as wheat. Some of new cropping options include grape production and organic crop/livestock production on small to large acreages adjacent to or in close proximity to ODOT managed rights-of-way. Grapes along with some other crops have been labeled as "ultra sensitive" to some herbicides used for vegetation management on ODOT easements. Consistent with the ODOT "Good Neighbor" policy, ODOT has initiated a "no spray" buffer around vineyards. These buffer zones may be of varying sizes. Additionally, the buffer zone concept may also be expanded to include other sensitive crop areas such as those containing cotton. Widespread presence of sensitive crops and subsequent no-spray buffer zones will necessitate a different approach to management of non-desirable vegetation in these zones. The option for use of the Speidel Weed Wiper was elaborated upon in the report "**1999 Annual ODOT Report on Roadside Vegetation Management Equipment: Project 2130: Section 2**" that was presented to ODOT as part of the joint continuing effort between the Oklahoma State University RVM (Roadside Vegetation Management) Program and ODOT. The main focus of the findings in that report where the need for ODOT to control switchgrass infestations in clear zones/safety zones and johnsongrass in wildflower plantings. Both issues continue to be management concerns for ODOT to this day and wiper recommendations are contained in the current Oklahoma Cooperative Extension Service circular **E-958, September 2006**.

In addition to switchgrass and johnsongrass concerns, wiper use with glyphosate has new possibilities for reducing the potential of herbicide drift onto adjacent ultra-sensitive crops. Due to the very low volatility of glyphosate, vapor drift is virtually nonexistent. The Speidel Weed Wiper, because of its design to wipe rather than spray glyphosate, can be safely used in areas immediately adjacent to sensitive crop sites.

Some ODOT herbicide applicators may have concluded that the Speidel Wiper technology was not very practical or viable. This conclusion may have been drawn based on the following assumptions:

- 1.) Long wiper booms (10'6") were cumbersome and did not conform to easement surface contours, both concave and convex situations, which resulted in gaps in the wiping pattern or the wiper bar possibly "bottoming out" and hitting the soil surface.
- 2.) The operator may have had to dismount from the tractor and manually adjust the wiper height to successfully apply the glyphosate to the weed target due to a frequent need to change the height of wiper boom.
- 3.) Due to the long turning radius of conventional tractors, movement within the highway easement was restricted and this may have required the operator to traverse the highway surface which increases the risk of motorist vehicle-tractor operator collision.

ACR Sales (Norman, OK) has developed a simple mounting bracket system for ATV/utility vehicles that enables the ATV operator to make wiper-bar height adjustments without dismounting the ATV. This ability saves valuable man-hours and increases the acres per hour treated as well as the acres per application event treated. The relatively tight turning radius of these types' vehicles also allows the operator more safety by allowing them to stay in the easement and off of the highway itself. The multi-tasking capabilities of the utility vehicles are also a very appealing feature that has perpetuated their use in the Texas Department of Transportation (TXDOT) maintenance fleet. The TXDOT utilizes approximately 30 utility vehicles state-wide for vegetation management (personal consultation, Steve Prather, TxDOT, December 11, 2006 and Robert Watts, District Vegetation Manager, TxDOT Odessa District, December 12, 2006).

2.0 ACR Sales ATV/Utility Vehicle Bracket

ACR Sales ATV/utility vehicle mounting bracket for the attachment of the Speidel Weed Wiper has made operation of the wiper simpler and more efficient. Assembly of the prefabricated bracket system does not require any special tools and is relatively easy to assemble and install. The bracket system can be mounted to either an ATV or a utility vehicle similar to those produced by manufactures such as Kawasaki (Kawasaki Mule). The complete system includes all necessary square tubing hardware, bolts and angle iron wiper mounting bar. An assembled bracket and Speidel 8' wiper boom is depicted in Figure 1. As is apparent in Figure 1, the ATV/utility vehicle mounted system allows the vehicle operator to manually adjust treatment height (1 inch to 40 inches) without dismounting the vehicle. This is accomplished through the use of a simple screw mechanism that requires no external power source other than the operator themselves. Figure 2 shows the bracket assembly with all loose parts (minus angle iron wiper support bar) assembled and ready to be mounted to the ATV. Figure 3 depicts sequential steps in the assembly process from shipped components (bracket assembly and Speidel wiper bar holder) to an assembled bracket minus the wiper support bar. Figure 4 depicts the mounting of the bracket assembly and angle iron wiper support bar to the front rack of a Honda 4-wheeler. Cost of the bracket mounting system is listed as \$235 per unit and an 8' Speidel Weed Wiper is listed at \$160 per unit (August 10, 2006, personal consultation, Carl V. McElhiney, owner ACR Sales).

3.0 ACR Sales ATV/Utility Vehicle Bracket Summary with Recommendations

In those ODOT maintenance areas containing numerous sensitive crop/locations that require "no spray" buffer zones or those heavily infested with switchgrass the utility vehicles equipped with the Speidel 8' wiper and mounting bracket are a viable option to broadcast treatments from conventional ODOT spray trucks. The use of these wiper units and glyphosate removes the possibility of vapor and particle drift. It is the recommendation from the OSU RVM Program that ODOT explore the use of utility vehicles equipped with the Speidel 8' weed wiper and mounting bracket as an alternative for conventional weed control applications. Utility vehicles equipped with this herbicide application method would be able to address weed control involving sensitive crop sites without putting ODOT vegetation management efforts at risk from crop damage claims. The OSU RVM Program would be ready to assist in this implementation of this weed control option effort if ODOT would like to try this method on a limited basis in divisions/counties with high risk drift areas. The Oklahoma Department of Agriculture, Food &

Forestry (ODAFF, Pesticide Sensitive Location Viewer, <http://maps.oda.state.ok.us/website/pestvuln/viewer.htm> , December 11, 2007) has identified several Oklahoma counties as having a high density of organic farming (Major County) and grape production (Lincoln County). These ODOT county yards may be locations where this application method could be utilized on a trial basis. After an assessment period, this application method could be expanded into other divisions or counties needing an alternative herbicide application method to the current conventional broadcast herbicide spray applications. The OSU RVM Program feels that this alternative application method has merit and other departments of transportation, including TxDOT, have adopted utility vehicle use in their roadside vegetation management efforts. If ODOT representatives wish to contact ACR Sales directly, ACR Sales can be contacted at:

ACR Sales
5050 84th Ave. N.E.
Norman, OK 73026
Phone: 1-800-544-1546
Fax: 405-321-7885
www.acrsales.com

4.0 Calc-An-Acre Astro II GPS Speed Sensor

For many years ODOT has used the Calc-An-Acre digital speed devices to accurately monitor sprayer ground speed. The Calc-An-Acre relied on a cable, which ran on the underside of the spray truck, to transmit electronic signals from a sensor/magnet system or from a transmission harness system. Over the years both of these systems have had consistent problems with reliability and durability. The manufacturer of the Calc-An-Acre, Micro-Trak Systems, Inc., has come up with a new system/sensor that does not rely on cable systems on the underside of the vehicle. The new system, called the Astro II GPS Speed Sensor, will work on all old Calc-An-Acre units that have the dial in the front center of the unit. As the name implies, GPS (Global Positioning System), this unit will rely on a signal from a satellite so there will be no cable on the underside of the vehicle but rather a small receiver on top of the cab or on the truck dashboard. The Astro II sensor has been tested on ODOT spray trucks and has been easy to install and calibrate. At the time of this report OSU is trying to test the Astro II sensor on more ODOT spray trucks to make sure it will work on all vehicles. By design, the Astro II sensor should work on any spray vehicle as it is independent of the vehicle, unlike the old sensor/magnet or transmission harness systems. The Astro II GPS Speed Sensor (Part Number 01410) unit will cost somewhere between \$250 and \$300/unit depending on the number of units purchased by ODOT. This item can be purchased from Wylie Sprayers, Oklahoma City, OK, 405-946-4896 (ask for Carlyle). OSU personnel will provide training on the Astro II sensor at the 2007 ODOT CEU Herbicide Applicator Workshops at each field division.

Figure 1. Image of ACR Sales ATV/Utility Vehicle Bracket Mounted to Honda 4-Wheeler.



Figure 2. Image of ACR Sales ATV/Utility Vehicle Bracket Assembled Prior to Vehicle Mounting.



Figure 3. Images of ACR Sales ATV/Utility Vehicle Bracket Assembly.



Figure 4. Images of ACR Sales ATV/Utility vehicle bracket and Speidel Wiper boom mounting on ATV.

