

# Cultivating Cumberland

October - 2016 VOL. 21, ISSUE 10



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**Cooperative Extension  
of Cumberland County**



1915-2015

## Application period for FY17 conservation Programs open until October 21

**Barbara Phillips, Public Affairs Specialist USDA**

State Conservationist, Carrie Lindig, is reminding agricultural producers and forest land managers that applications for certain conservation programs available from USDA, Natural Resources Conservation Service (NRCS) must be submitted by October 21st to be considered for FY2017 funding.

Agricultural Management Assistant (AMA) and the Environmental Quality Incentives Program (EQIP), EQIP Conservation Activity Plans and EQIP initiatives are available for landowners and managers throughout New Jersey. In addition to the anticipated FY17 allocation for New Jersey, NRCS has set aside nearly \$1 million for conservation activity in areas of the Delaware Watershed through a Regional Conservation Partnership Program (RCPP) agreement. Farms and forest land in the highlands, the Kirkwood-Cohansey, and the Pocono-Kittatinny areas are eligible for these funds thanks to the Delaware River Watershed Working Lands Conservation Protection project that was selected by NRCS to be included in RCPP in 2015.

An interactive map with description of these focal areas in the Delaware Watershed is linked from the NJ NRCS RCPP web page. Navigate to the map from [www.nj.nrcs.usda.gov](http://www.nj.nrcs.usda.gov) and follow Programs>Farm Bill>Regional Conservation Partnership Program. Landowners participating in the Environmental Quality Incentives Program with farm or forest land in the focal areas (within the cluster areas) may be eligible for additional assistance from RCPP partnering organizations. To learn more about this additional funding, landowners in these focal areas should contact the appropriate organization.

Applications for NRCS programs are accepted year round, with application periods set throughout the year so funding can be awarded. Interested producers and land managers should visit their local NRCS service center, 1318 S. Main Rd., Bldg. 5, Suite A, Vineland, NJ (856-205-1225 x3) for information on EQIP and AMA. Program information is also available at [www.nj.nrcs.usda.gov](http://www.nj.nrcs.usda.gov)

***Rutgers Cooperative Extension 100 Years of Service in Cumberland County***

*A monthly report to the produce industry on the Center for Produce Safety research projects*

## 'Dipstick' may offer rapid on-farm bacterial testing of water, produce samples

A team from the University of Massachusetts and Cornell University is nearing completion of a test that can quickly detect *Salmonella* species or other produce pathogens, is relatively inexpensive and can be used on the farm. Now in its second year, the research is being led by Sam R. Nugen, an associate professor of food science at Cornell University in Ithaca, N.Y.

Laboratories currently use plate culturing methods to detect pathogens, but the process is lengthy and may not deliver results in a useful time period. The researchers' goal is to develop a

simple, inexpensive test that could provide results in a matter of a few hours and be used as a tool by growers to make timely risk assessments. "This will give growers a better idea that something might be a problem so they can take action on it," Nugen said. Collecting water for pathogen testing is fairly straight forward, but the challenge has been sampling the produce itself.

In order to conduct an assay, the bacteria must first be separated from the plant material. "How can we pretreat samples if we have something like produce, which might have internalized pathogens or biofilms?" Nugen said. To do that, the researchers harnessed enzymes that digest the leafy plant material. Nugen said this process results in recovering twice as many *Salmonella* organisms compared to just washing plant leaves and collecting the rinse water. Users simply place a leaf sample in a small plastic bag that contains enzymes and incubate it for about 1.5 hours. Users would then squeeze a small liquid sample through a filter and place it in a tube with bacteriophages - viruses that are harmless to humans but infect specific bacterium, such as *Salmonella* or *E. coli*. Some phages are so specific they will only infect one bacterium serotype while others will infect a broader range of serotypes within an individual species. Phages also will only infect and replicate in viable bacteria, ensuring that non-viable organisms are not detected. This distinction is useful if prior mitigation steps, such as chlorination, have already been used. The phages used in the test were engineered to insert a particular gene into the bacteria. Nugen credited Dr. David Sela, an assistant professor of microbiology at the University of Massachusetts, Amherst, for his expertise with the genetic engineering of the phages.

Ideally, Nugen said, the test would use a cocktail of about 10 to 15 phages, with some having a very specific host range and some very broad. The engineered phages seek out and bind to target organisms while at the same time initiating infection and replication. When the process is completed, the bacteria cell wall lyses or breaks down, releasing the replicated engineered phages - a process known as amplification. The phages are engineered with a reporter enzyme, which can be detected in the last step of the process.

### Key Take-Aways

- Test can be used in low-resource settings, like farms
- Results are known in about 5 hours, not days
- Tests can be developed to target as broad or narrow a range of pathogen serotypes as desired

This final step involves putting a few drops of reagent in the tube, waiting a few minutes and inserting a dip stick similar to those used in over-the-counter pregnancy tests. Known as a lateral flow assay, the dipstick can quantify the reporter enzyme expressed by bacteria during the infection with the engineered phages. By using multiple phages/enzymes, several bacteria can be targeted simultaneously. If the reactive portion of the dipstick remains white, it means that a very low number or no target organisms were detected.

Nugen was quick to point out that just because a user receives a negative result doesn't mean pathogens aren't present. The test reflects one sample collected from one location at a single point in time. Instead, he said the tests should be viewed as another tool to help growers make more informed decisions. "They might be deciding about using irrigation water from a river and are worried about a gross contamination that might have occurred upstream," he said. "Or they're routinely using produce rinse water, and they might want to check to see if there are different time periods when *Salmonella* is showing up."

The researchers have put their rapid assay to real-world tests on samples of rinse water collected from four Massachusetts commercial produce operations by Dr. Amanda Kinchla, a University of Massachusetts Extension food safety specialist and project collaborator. "We wanted to know the highs and lows in salinity and pH to make sure our phages would bind and work," Nugen said.

### R U Ready to Farm Program

**Where:** Rutgers Eco-Complex, 1200 Florence Columbus Rd, Bordentown Township, NJ 08505

**When:** Saturday, October 22, 8:00am-5:00pm (one day registration for this date only)  
 Wednesday, October 26, 6:00pm-9:00pm  
 November 5, 2016, 8:00am-1pm Farm Tour & Demonstration: Specca farms  
 Dress for outdoor activities for the farm tour day

Contact [Hlubik@aesop.rutgers.edu](mailto:Hlubik@aesop.rutgers.edu), [Armstrong@aesop.rutgers.edu](mailto:Armstrong@aesop.rutgers.edu) for more information\*

All participants receive a program certification. Qualified undergraduates can register to receive one Rutgers University credit and register as they would for other credit courses under 11 020 490 with a special permission number

Topics covered:

- Traditional & Organic farming, funding, and land opportunities in New Jersey
- Organizations that provide support for beginner farmers
- Basic overview of farm business planning and recordkeeping
- Determining options for production of crops and raising animals
- Regulatory issues and important considerations for beginners
- Future training opportunities and on-farm training
- Visits to two successful small farms with on-farm demonstrations

**REGISTRATION ON-LINE AT:** [www.cpe.rutgers.edu/readytofarm](http://www.cpe.rutgers.edu/readytofarm)

#### 3 Day Registration

\$150 Adults  
 \$100 high school students  
 \$125 Master Gardeners  
 \$225 2 Business partners/2 family members

#### One Day Registration (10/22/16)

\$75 Adults  
 \$50 High school students/4H/FFA  
 \$60 Master Gardeners  
 \$120 2 Business partners/2 family members

On behalf of The Center for Produce Safety, our appreciation to the Produce Marketing Association for developing and sharing this document following the 7th annual CPS Research Symposium held in Seattle, WA.

## Center for Produce Safety

### 2016 Research Symposium Key Learnings

Over the next couple of months, we will include a couple of Key Learnings until you have received all of them.

**Introduction:** The seventh annual CPS Research Symposium was held in Seattle, WA on June 28-29, 2016. As in years past, the produce safety research community came together to share the latest results from CPS-funded programs and to discuss how the data can be used to build risk and science-based food safety programs for produce companies all along the supply chain. The interpretation of food safety research results and application to individual companies is most appropriately the undertaking of those that reside within those specific operations. However, we highlight these key learnings from the CPS Symposium to create awareness and stimulate thought.

#### 2016 Key Learnings:

- 1. It is important to learn from illness outbreaks and recalls to prevent repeating the same mistakes.** The U.S. apple industry was dramatically impacted by a 2014 outbreak of listeriosis traced back to caramelized apples originating from a relatively small California apple producer. A general session at the Symposium dissected the outbreak from a scientific and public health perspective. The role of whole genome sequencing as a tool in the epidemiological traceback, observations from the production facility investigation, research results demonstrating the potential for *Listeria monocytogenes* (Lm) growth in caramelized apples, failures in communications between industry and regulatory agencies and between the U.S. and export partners and the role that social media played were examined. Most importantly, the actions of the apple industry in the Pacific Northwest subsequent to the outbreak were highlighted. The industry moved quickly to provide education and training to apple producers about Lm and focused on equipment and facility sanitation. It is important to evaluate equipment and sanitation practices to insure that cleaning and sanitation is effective and Lm is not permitted to become resident. It is also important to understand how produce is being used in the manufacture of other products and what impact that might have on its safety. Lastly, being prepared for a food safety event is imperative. Having proper lines of communication within your company, the industry, the regulatory agencies and even at a country to country level are keys to insuring proper public health protection is maintained and the event stays focused properly.
- 2. Generic *E. coli* has limitations as an indicator for irrigation water quality.** We have three options for measuring the microbial quality of irrigation water: (a) test for microorganisms that serve as *indicators* for the presence of fecal contamination and a proxy potential public health risk, (b) test for *indexing microorganisms* that estimate a microbial hazard whereby an increase in number correlates with an increased probability of a human pathogen presence and (c) measure *human pathogens* directly. Generic *E. coli* is often used as an indicator for irrigation water

testing. It is relatively inexpensive and a number of test procedures are available. It is also the law as mandated by Food Safety Modernization Act (FSMA); more specifically the produce rule dealing with irrigation water. However, testing for generic *E. coli* may have limited value. In irrigation ponds in Georgia, Kahler (CDC) reported generic *E. coli* was not correlated with positive findings for *Salmonella*. Jay-Russell (UC-Davis) reported the same lack of correlation between generic *E. coli* and *Salmonella* when sampling irrigation ponds. Suslow (UC-Davis) reported similar observations in western U.S. irrigation waters tested positive for *Salmonella* and STEC's at a rate of 24% even though generic *E. coli* tests fall under the 126 MPN/100 ml threshold used in EPA recreational water standards and subsequently irrigation water action levels. However, Suslow noted that generic *E. coli* has value when used within the context of longer-term evaluations of irrigation water. When an irrigation water source and delivery system has been characterized using generic *E. coli* over a period of growing seasons, significant fluctuations from the baseline may indicate a compromised irrigation source and/or delivery system and should trigger a system inspection and perhaps more concentrated testing.

3. Alternative microbial water quality indicators and indexing organisms are on the horizon. There are a number of exciting efforts to find better indicators and indexing organisms to permit actionable irrigation water quality evaluations. Bright (University of Arizona) pointed out the importance of understanding the physical and chemical parameters of irrigation waters regionally when looking for indicator organisms. Some potential indicators; Enterococci and bacteriophage, were not associated with the presence of *Salmonella* in pond water samples (Kahler), while work continues on certain enteric viruses (Bright) and a number of bacteria including; Bacteroidales, Bacteroides, Bacillales, Fluviicola and Rhizobacter (Gu and Suslow). Bacteroidales have the advantages of not growing in the environment and they are strongly associated with their host enabling source tracking assessments. The take home message for most growers is to keep a watch on this area of research. As these candidate indicators and indexing organisms are better understood, we may have more relevant targets for irrigation water testing. It is likely that no single indicator organism will meet all needs and collections of indicators may well hold the key for future water assessments.

### New Rutgers Fact Sheets

The following fact sheets are now available on NJAES publications on the website ([www.njaes.rutgers.edu/pubs](http://www.njaes.rutgers.edu/pubs))

FS1256      Incorporating Soil Biology into Soil Health Assessment

FS097      Growing Strawberries in the Home Garden

## **Calendar of Important Events**

📅 Indicates the newly added event since last calendar

### **October 2016**

#### **October 5-7**

**HACCP Plan Development for Food Processors**, Rutgers Continuing Education; \$995. For more information call 1-848-932-9271 x2 or visit: [www.cpe.rutgers.edu/FOOD](http://www.cpe.rutgers.edu/FOOD)

#### 📅 **October 11**

**Hops and Crops**, Cape May Brewery, 10 Norret Rd., Cape May, NJ; 6-9pm. Registration is required. For more information and to register contact Brittany Dobrzynski 609-400-3826 or email: [Brittany.Dobrzynski@njudubon.org](mailto:Brittany.Dobrzynski@njudubon.org)

#### **October 14-16**

**Produce Marketing Association Fresh Summit**, Orlando, Florida. For more information visit: [www.pma.com](http://www.pma.com)

#### **October 17-18**

**Sensory Evaluation**, Rutgers Continuing Education. For more information call 848-932-9271 or visit: [www.cpe.rutgers.edu](http://www.cpe.rutgers.edu)

#### **October 19**

**Statistics for Food Scientists**, Rutgers Continuing Education, New Brunswick. For more information call 848-932-9271 or visit: [www.cpe.rutgers.edu](http://www.cpe.rutgers.edu)

#### 📅 **October 22, 26 & Nov. 5**

**R U Ready to Farm**, Rutgers Eco-Complex, 1200 Florence Columbus Rd., Bordentown Twp., NJ. Day 1 8am-5pm, (one day registration available for this day only); Day 2 6pm-9pm and Day 3 8am-1pm. Register online at: [www.cpe.rutgers.edu/readytofarm](http://www.cpe.rutgers.edu/readytofarm). For more information contact: [Hlubik@aesop.rutgers.edu](mailto:Hlubik@aesop.rutgers.edu) or [Armstrong@aesop.rutgers.edu](mailto:Armstrong@aesop.rutgers.edu)

#### 📅 **October 27**

**Ultra-Niche Crops Series: Mixed Cut Flowers**, Class locations: Bridgewater, Bordentown and Bridgeton; Dinner at 5:30pm; class 6-8pm. Cost \$15.00. To register visit: <http://tinyurl.com/UNC2016cutflowers>; deadline to register is Oct. 21, 2016. For more information email Jennifer Matthews: [JLM479@njaes.rutgers.edu](mailto:JLM479@njaes.rutgers.edu)

### **November 2016**

#### **November 7-9**

**Better Process Control School**, Rutgers Continuing Education, New Brunswick, NJ. \$995 by 10/24; \$1095 after. For more information call 848-932-9271 or visit: [www.cpe.rutgers.edu](http://www.cpe.rutgers.edu)

**November 15-16**

**Drone World Expo**, San Jose Convention Center, San Jose, CA. For more information visit: [www.droneworldexpo.com](http://www.droneworldexpo.com)

**November 19**

**Thanksgiving Floral Arrangement Class**, 2016 Horticultural Programs/Events, Park Commission Headquarters, North Branch Park, 355 Milltown Road, Bridgewater. 10 a.m.—12 noon; \$25 per person with a limit of 15 people and includes supplies. Pre-registration due by Thursday, November 10th is required. For more information call 732-873-2459 x21 or visit: [www.somersetcountyparks.org](http://www.somersetcountyparks.org)

**December 2016****December 3**

**Holiday Kissing Ball Workshop**, 2016 Horticultural Programs/Events, Park Commission Headquarters, North Branch Park, 355 Milltown Road, Bridgewater. 10am-12 noon; \$45 per person (limit 15 people & includes supplies). For more information call 732-873-2459 x21 or visit: [www.somersetcountyparks.org](http://www.somersetcountyparks.org)

**December 5-6**

**Practical Food Microbiology**, Rutgers Continuing Education, New Brunswick, NJ. \$795 by 11/21; \$825 after. For more information call 848-932-9271 or visit: [www.cpe.rutgers.edu](http://www.cpe.rutgers.edu)

**December 6-8**

**Great Lakes Fruit, Vegetable and Farm Market Expo**, Devos Place Conference Center, Grand Rapids, Michigan. For more information call 616-794-0492 or visit: [www.glexpo.com](http://www.glexpo.com)

**December 7-8**

**Irrigation Show**, Las Vegas Convention Center, Las Vegas, Nevada. For more information visit: [www.irrigation.org](http://www.irrigation.org)

**📅 December 14-15**

**Food Safety Modernization Act—Produce Rule Training & Plan Writing for Beginners**, Cumberland County Cooperative Extension, 291 Morton Avenue, Rosenhayn, NJ; 9 am–4 pm; \$50/person Day 1 and \$25/person Day 2 (optional). Cost includes lunch and materials. To register call Tammy at 856-451-2800 x1.

**February 2017****📅 February 9**

**Food Safety Modernization Act—Produce Rule Training**, Held during the 2017 NJ Agricultural Convention & Trade Show, Harrah's Resort, 777 Harrah's Boulevard, Atlantic City, NJ. 9 am—4 pm; Cost \$35/person prepaid/at the door. Cost includes materials. Lunch not included. To register call Tammy at 856-451-2800 x1.

**February 22-23**

**Food Safety Modernization Act-Produce Rule Training & Plan Writing for Beginners**, Mercer County Cooperative Extension, 930 Spruce St., Trenton, NJ; 9 am-4 pm; \$50/person Day 1 and \$25/person Day 2 (optional). Cost includes lunch and materials. To register call 856-451-2800 x1.

**March 2017****March 1-2**

**Food Safety Modernization Act-Produce Rule Training & Third Party Audit Plan Writing**, Cumberland County Extension Center, 291 Morton Ave., Rosenhayn; 9 am-4 pm; \$50/person Day 1 and \$25/person Day 2 (optional). Cost includes lunch and materials. To register call Tammy 856-451-2800 x1.

**March 8-9**

**Food Safety Modernization Act-Produce Rule Training for Blueberry Growers & Third Party Audit Plan Writing**, Marucci Center for Blueberry & Cranberry Research & Extension; 125A Lake Oswego Rd., Chatsworth, NJ; 9am-4pm; \$50/person Day 1 and \$25/person Day 2 (optional). Cost includes lunch and materials. To register call Tammy 856-451-2800 x1.

**March 22-23**

**Food Safety Modernization Act-Produce Rule Training & Plan Writing for Beginners**, Hunterdon County Extension, 314 State Route 12, Bldg. 2, Flemington, NJ; 9am-4pm; \$50/person Day 1 and \$25/person Day 2 (optional). To register call Tammy 856-451-2800 x1. NOTE: Tentative location.

## REGULARLY SCHEDULED MEETINGS

✓ Indicates meeting will be held at RCE of Cumberland County

<p>✓</p> <p><b>Pesticide Certification Exam Schedule—Cumberland County</b> 291 Morton Avenue Millville, NJ 08332 (Between Rosenhayn &amp; Carmel)</p> <p><u>2016</u></p> <p>Oct 20</p> <p>To Register call 609-984-6614 For directions call 856-451-2800</p> <p>*****</p>	<p>✓</p> <p><b>Cumberland County Agriculture Development Board</b> Soil Conservation Office 1516 Highway 77 Deerfield Street, NJ 08332</p> <p><u>2016</u></p> <p>Oct 12    Nov 9    Dec 14</p> <p>Reg. Meetings start at 7 p.m. Information call 856-453-2211</p> <p>*****</p>	<p>✓</p> <p><b>Cumberland County Board Of Agriculture</b> 291 Morton Avenue Millville, NJ 08332 (Between Rosenhayn &amp; Carmel) 7 pm meetings</p> <p><u>2016</u></p> <p>Oct 20 Nov 17                      Dec 15</p> <p>For info call Hillary Barile, President 856-453-1192</p> <p>*****</p>
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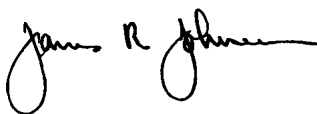
**Cumberland County Improvement Authority (CCIA)  
Pesticide Container Recycling  
9:00 a.m. to 12 Noon**

Cumberland County Solid Waste Complex  
169 Jesse's Bridge Rd. (located off Route 55 Exit 29)  
Deerfield Township, New Jersey

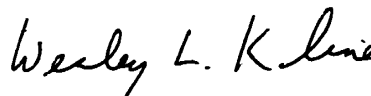
Questions? Call Division of Ag & Natural Resources, NJ Dept. of Ag 609-292-5532

Oct 21    Nov 18

Sincerely,



James R. Johnson  
Agricultural Agent  
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**Pesticide User Responsibility:** Use pesticides safely and follow instructions on labels. The user is responsible for the proper use of pesticides, residues on crops, storage and disposal, as well as damages caused by drift.

**Use of Trade Names:** Trade names are used in this publication with the understanding that no discrimination is intended and no endorsement is implied. In some instances the compound may be sold under different trade names, which may vary as to label.

Have you visited the Cumberland County website for the  
Present and/or past issues of "Cultivating Cumberland"? It's a great  
resource for information and dates.....  
<http://Cumberland.njaes.rutgers.edu/>

Public Notification and Non-discrimination Statement

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U. S. Department of Labor  
Occupational Safety and Health Administration  
Directorate of Science, Technology & Medicine  
Office of Science and Technology Assessment

## **Hazards Associated with All-Terrain Vehicles (ATVs) in the Workplace**

Safety and Health Information Bulletin

SHIB 08-03-2006

### **Preface**

Although the majority of all-terrain vehicle (ATV)-related injuries and deaths occur during recreational use, ATV use in America's workplaces is widespread and increasing, particularly in the agricultural industry. Injury and fatality statistics for ATV recreational use may provide some information about likely trends in the workplace. In September 2005, the Consumer Product Safety Commission (CPSC) published a report indicating that ATV-related fatalities rose from 29 in 1982 to 470 in 2004, and injuries rose to an all-time high of 136,100 for 2004, with over 800,000 injuries reported in the last 10 years [4].

Although these statistics were only for recreational use of ATVs (occupational injury data for ATVs is not collected, compiled and reported in the same manner as that for recreational use), employees who use ATVs while doing their jobs are exposed to hazards similar to those experienced by recreational users. Data on occupational injuries provided to the Bureau of Labor Statistics (BLS) by employers includes over 100 occupational fatalities involving ATVs during the last ten (10) years. (see Table 1) [6] Fatalities and injuries appear to have occurred at a steady rate during the last several years. The Occupational Safety and Health Administration's (OSHA's) investigation data includes 50 workplace accidents in the last ten (10) years that resulted in a workplace injury or fatality and involved an ATV. As ATV use increases in the workplace, employers and employees can reduce the risk of injury by modifying work practices, operating ATVs within manufacturer's limitations, wearing helmets, and obtaining vehicle-specific training.

This Safety and Health Information Bulletin is **not** a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with hazard-specific safety and health standards. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any recommendations in this Safety and Health Information Bulletin is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.



**Figure 1: All-Terrain Vehicle (ATV).**

## Purpose

The purpose of this Safety and Health Information Bulletin (SHIB) is to identify:

1. the operating conditions and specific activities that most often lead to ATV-related injuries and fatalities;
2. the guidelines and training an employer can use to help protect employees; and
3. the work practices that employees can follow to reduce the potential for ATV-related accidents.

This SHIB is intended to address any motorized off-highway vehicle designed to travel on low pressure tires, having a seat designed to be straddled by the operator and handlebars for steering control, for use by a single operator and no passenger, and used to carry only those amounts of cargo that do not exceed the manufacturer's limits for the front and rear racks.

## Background

ATVs are used in a wide variety of America's workplaces, including law enforcement, agriculture, construction, oil production, and facilities management. It is imperative that employers and employees take the necessary steps to ensure that ATVs are operated safely to minimize the number and severity of workplace accidents.

The Occupational Safety and Health Administration (OSHA) has investigated a number of workplace fatalities involving ATVs and is aware that ATV-related injuries and fatalities continue to occur in workplaces throughout the United States. In June of 2003, the Bismarck, North Dakota Area Office investigated an accident where an employee was fatally injured while driving an ATV uphill on rough terrain. The employer had fitted the ATV with a sprayer mounted on the rear cargo rack. The ATV was being used to apply herbicide to off-road weeds when the accident occurred. As an employee drove the ATV uphill on the rough terrain, its front wheels came off the ground and the ATV flipped over. The employee tried to prevent the ATV from flipping by

**Table 1: Bureau of Labor Statistics  
ATV Occupational Fatalities & Injuries**

Year	Fatalities	Injuries*
2001	14 <sup>(n)</sup>	240
2000	16	135
1999	13	227
1998	9	59
1997	9	56
1996	16	246
1995	9	186
1994	9	246
1993	7	117
1992	11	113
<b>Total</b>	<b>113</b>	<b>1625</b>
*Nonfatal occupational injuries and illnesses involving days away from work, including those with or without restricted work activity.		
* Excludes September 11 <sup>th</sup> terrorist attacks		

standing and shifting her weight; the employee eventually tried to jump from the ATV as it flipped over, but could not jump clear and was fatally crushed. OSHA's investigation identified decreased vehicle stability as the major cause of the accident. The addition of the sprayer to the ATV's rear cargo rack reduced vehicle stability by changing the distribution of vehicle weight over the wheel base. The sprayer exceeded the manufacturer's weight limit for the rear cargo rack by approximately 55 pounds (lbs.). OSHA's investigation also showed that the decrease in ATV stability was compounded when the ATV was driven up a hill on rough terrain.

OSHA accident investigation data dating back to 1990 include 24 occupational fatalities and 26 occupational injuries that involved operating an ATV. OSHA's data indicate that seven serious injuries and fatalities resulted from unbalanced loads and loads in excess of the ATV's specified limits; four of these involved overloading the rear cargo rack. The other causes of occupational accidents noted during OSHA investigations included: operating at excessive speeds for the terrain/operation; operating ATVs on paved roads; not wearing a protective helmet; insufficient or no training; and carrying passengers.

## **Description of Hazards**

### ***ATV Terrain and Operating Conditions***

One reason employers may elect to use ATVs is that they enable employees to traverse rough terrain and get to remote locations quickly. However, it is very important that operators drive at a safe speed to accommodate the changing terrain (rocks, logs, ditches, and other obstacles) and to reduce the risk of overturning or rolling over the ATV. Traversing a slope also presents a rollover hazard to ATV operators. Rolling over or overturning an ATV is one of the leading incidents that result in fatalities [1, 5]. About 46 percent (23 of 50) of the occupational injuries and fatalities OSHA investigated (1990 – 2003) occurred when the ATV overturned. According to the investigation reports, operators overturned as a result of excessive speed, unstable load, rough terrain, and excessive incline.

ATVs are specifically designed for off-road use and are not intended to be driven on concrete or paved roads. Injuries and fatalities can occur as a result of collisions with other vehicles and as a result of the difficulty of controlling an ATV on pavement [5].

### ***Load Limitations and ATV Modification***

ATVs are engineered for certain operating conditions and for handling specific loads. Modifications to an ATV may alter its performance and increase the potential for an accident. Any modification to an ATV should be performed only after obtaining approval from the manufacturer. Modification includes the use of after-market products that are sold as accessories. Employers and drivers should read the operator's manual to understand the limitations of ATVs. The cargo (front and rear racks) and passenger weight limits of an ATV should not be exceeded because it affects the ATV's maneuverability and performance. As stated earlier, exceeding an ATV's weight capacity is a common cause of serious ATV accidents.

ATVs are not typically designed to carry passengers, and a common mistake made by ATV operators is to allow a passenger on their ATV. To

effectively steer and control an ATV, the driver often needs to make quick body weight shifts combined with acceleration and braking [1]. A passenger can impair the safe operation and maneuverability of the ATV and the additional passenger weight may exceed the manufacturer's weight limit for the ATV. Passengers are put at a high risk of injury when riding on an ATV. The CPSC reported that up to 20 percent of recreational ATV injuries occur to passengers [3, 5]. OSHA's data indicate that two occupational injuries occurred when passengers were carried on ATVs designed only for the operator. In one case, a passenger was thrown from the ATV during a turn. In the other, the passenger was pinned under the ATV when it overturned. In both cases, vehicle instability created by the additional rider likely caused the accident.

### ***ATV Operator Qualifications and Training***

Inexperienced drivers face a higher risk of injury according to the recreational data collected by CPSC. During the first month of operation, new recreational ATV drivers have an injury rate 13 times higher than the overall average injury rate for ATV operators. Further, the CPSC's data indicate that almost half the injured drivers had less than one year of experience and one-fourth of the injured drivers had less than one month of experience [5]. The often severe terrain and operating conditions, along with the unique handling of ATVs, necessitate proper training, practice, and experience.

### ***Personal Protective Equipment***

Personal protective equipment is strongly recommended when operating ATVs. The potential rollover hazards require the use of a DOT-approved helmet. According to a study of recreational ATV-related deaths in West Virginia, 65 percent of the deaths resulted from head and neck injuries. Of these fatalities, three-quarters of the ATV users were not wearing a helmet at the time of the incident [1]. CSPC indicates that 25 percent of those who died from head injuries sustained in recreational ATV accidents would have lived if they had been wearing a proper helmet [5]. In addition to helmets, appropriate boots, gloves, and goggles should also be worn.



Figure 1: Rider with proper helmet.

### *ATV Maintenance*

Like any piece of workplace machinery, ATVs must have regular maintenance. Poor ATV maintenance contributes to serious accidents and fatalities [2]. Along with a regular maintenance schedule, employers and drivers need to ensure the completion of a pre-ride inspection. Tire condition, braking, steering, and suspension systems are all critical to safe operation.

### *Other Considerations*

ATV manufacturers sometimes issue product recalls to replace, modify, or repair faulty products. Employers should be aware of how recall notifications are made and where to obtain pertinent information. The CPSC maintains copies of ATV recalls, which may be accessed on the CPSC's website at <http://www.cpsc.gov>. When a recall is issued by a manufacturer, employers should follow the instructions or guidance in the notice to ensure that their ATVs are maintained in proper operating condition.

Three-wheel ATVs have not been manufactured since 1988, but older three-wheel ATVs are still in use. While the stability of ATVs as a whole is low, the stability of three-wheel ATVs is generally worse than for four-wheel ATVs. Cornering and traversing slopes on three-wheel vehicles can be particularly dangerous.

Most states have enacted laws regarding ATV use. Many states have passed laws prohibiting ATV operation on public roads in most instances, and some have age and registration requirements for ATV operators. Furthermore, many states require operators to wear a protective helmet while operating an ATV. Employers should contact their state Department of Motor Vehicles, Public Safety, or Natural Resources to determine the specific requirements and obligations for their state.

Some manufacturers now build certain ATVs with rollover protection systems. Depending on the terrain and usage of the ATV, employers should consider an ATV with rollover protection.

### **Recommendations**

The following guidelines will help reduce the risk of injury to employee operators of ATVs:

- Provide instruction and hands-on training on safe handling and operation of ATVs to employees. Ensure that employees are competent in operating their specific ATV under the variety of conditions in which they will be driving.
- The major ATV manufacturers and distributors provide free hands-on training to purchasers of new ATVs and can provide additional training at a reasonable fee. The ATV Safety Institute (<http://www.svia.org>) offers ATV classes that may be of assistance.
- Ensure that all likely ATV drivers have reviewed and understand the operator's manual.
- Ensure that all manufacturer's warnings are followed and that drivers review and understand them.

- Do not permit ATV drivers to carry passengers.
- Ensure that drivers wear proper helmets and boots. Where conditions require, ensure the use of goggles, gloves, and other safety clothing.
- Establish policies stating where ATV use is prohibited, such as on paved or public roads and in areas with high vehicular or heavy equipment traffic.
- Ensure that employees drive at appropriate speeds to allow for avoidance of potential hazards and the speed is appropriate for the type of terrain (e.g., mud, snow, ditches, gravel, etc.).
- Ensure that employees and all contractors using ATVs on your worksite are aware of any site-specific hazards, such as excavations, trenches, and areas where ATV use is prohibited.
- Establish a maintenance program for all ATVs that meets the manufacturer's recommendations to ensure proper ATV performance.
- Ensure that employees only haul items on the ATV in accordance with the manufacturer's specifications and never exceed the weight limit. Ensure loads are evenly distributed.
- Do not allow modification of ATVs without approval from the manufacturer.
- Monitor manufacturer's recalls and ensure prompt action when a recall is issued for your ATV(s).
- Training should include reviewing and becoming familiar with the operator's manual, and hands-on operation.
- Ensure that a pre-ride inspection of the ATV is performed.
  - o Check the tire condition and pressure.
  - o Ensure that the throttle, brakes, and other controls are working properly.
  - o Ensure that headlight(s) and taillight(s) are working properly.
  - o Test the steering before starting, initially at low speeds.
  - o Test the suspension system
- Ensure that ATV drivers report any damage or mechanical failures so that repairs can be made.

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