Plan Today

• Define drift
• Why is it a problem?
• Talk about ways to reduce drift incidence
Pesticide Drift

• Drift is defined as the movement of a pesticide from its intended target to a non-target area.
  o Drift is considered to happen during an application or shortly thereafter.
  o Does not include water erosion or wind-blown soils
  o Not to be confused with over spraying

Definition courtesy of the National Coalition on Drift Management
Pesticide Drift

Misapplication Facts (Courtesy of Sherm Takatori)

Source: Farmland Insurance
Pesticide Drift

Contributions to drift (Courtesy of Sherm Takatori)

- Nozzle: 26%
- Applicator: 38%
- Physical: 23%
- Other: 13%
Don’t get my drift!

• Pesticide drift has always been something we need to be aware of.
• Beyond the problem of where the drift travels to…that is wasted product!
Don’t get my drift!

- Public perception is pretty sensitive to perceived issues (drift or not)
  - Automatically assume the worst
  - Parma Motor Vu
  - Aerial applications issues in timber
  - Bee kills in the Willamette Valley (non-drift)
Don’t get my drift!

• Every time things go funky….
  o There is a potential for overreaction!
  o Pollinators are extremely important to Oregon's agricultural community, pollinating many crops. Oregon is proactive in protecting bees and other pollinators.
  o Environmental Protection Agency (EPA) has required special label restrictions to neonicotinoid pesticides in order to protect pollinators. The active ingredients that will have special label language are as follows:

    Clothianidin
    Dinotefuran
    Imidacloprid
    Thiamethoxam
THE NEW EPA BEE ADVISORY BOX
On EPA’s new and strengthened pesticide label to protect pollinators

PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS
PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW
APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT
POLLINATORS.

Look for the bee hazard icon in the Directions for Use for each
application site for specific use restrictions and instructions to protect bees and
other insect pollinators.

This product can kill bees and other insect pollinators.
Bees and other insect pollinators will forage on plants when they flower, shed pollen, or
produce nectar.

Bees and other insect pollinators can be exposed to this pesticide from:

- Direct contact during foliar applications, or contact with residues on plant surfaces after
  foliar applications
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment,
  soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:

- Minimize exposure of this product to bees and other insect pollinators when they are
  foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift
  of this product onto beehives can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide
Environmental Stewardship website at:
http://pesticidestewardship.org/pollinatorprotection/Pages/default.aspx

Pesticide incidents (for example, bee kills) should immediately be reported to the state/tribal lead agency. For
contact information for your state/tribe, go to: www.aapco.org. Pesticide incidents can also be reported to the
National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov

Read EPA’s new and strengthened label requirements: http://go.usa.gov/jHH4
Identifying Drift

• Know what the signs are:
  o With herbicides, be aware of selectivity
  o Look for patterns to indicate a direction or source
  o Look for low spots in a field where air could settle
Identifying Drift
Identifying Drift
Glyphosate @ 2oz/ac
Identifying Drift

Dicamba @ 1.5oz/ac
Glyphosate drift
Glyphosate drift
If you want to argue...

- Can submit tissue samples to a lab
  - Submit healthy tissue in addition to affected tissue (2 separate samples)
  - Expensive
  - Need to be willing to accept the results
If you want to go farther...

• Bring in a third party
  o Provides a perspective without a dog in the fight

• Report the situation to ODA

• Don’t Wait!
Special bulletin

• Please Use Caution When Applying Herbicides Near Grapes!
  o Patty Skinkis- an OSU extension viticulturist has distributed a document pleading for applicators to be careful.
  o This was done in conjunction with the Oregon Winegrowers Association
Issues with Drift

• **Spray drift is illegal.** Oregon protects every farmer’s right to farm. However, this does not include actions that damage other crops.

• **Working with neighbors.** Communication is critical. The Oregon Winegrowers Association urges vineyard managers to talk to neighbors and surrounding farmers to share information about the location of vineyards and sensitivity to certain herbicides.
Issues with Drift

- Grapevines are extremely sensitive to the application of certain herbicides commonly used by farmers and homeowners, especially phenoxy herbicides.

- Phenoxy herbicides include 2,4-D, MCPA, Crossbow, Banvel, Garlon, Weed-B-Gone, and Brush Killer, among others. The active ingredient of phenoxy-type herbicides may be listed on the label in “weed and feed” and brush control products for use in home landscaping as 2,4-dichlorophenoxy-acetic acid (2,4-D), 2-methyl-4-chlorophenoxyacetic acid, triclopyr, or dicamba.
Issues with Drift

• If possible, **avoid making herbicide applications during sensitive periods of grape growth and development.** Grapevines are vulnerable from the early growing period in March through leaf drop in October and are most susceptible from March-June.

• **Consider using an herbicide that does not contain a phenoxy-type active ingredient.** If a phenoxy-type herbicide is preferred, please consider using an amine (dimethylamine salt) formulation instead of an ester formulation.
Issues with Drift

- Ensure there is **good communication** between growers and hired commercial applicators so they have information regarding nearby sensitive crops.
- Ensure applicators **follow the instructions on the product label** when using herbicides.
- **Minimize drift** by reducing spray pressure, lowering boom height, using drift-reduction nozzles or certain spray adjuvants or selecting low or nonvolatile pesticides.
- **Learn about the factors that influence drift**, including: temperature, relative humidity, air flow patterns, temperature inversions and topography.
Issues with Drift

- Grapevines in close proximity to the application site are at most risk, but grapevines at greater distances may be vulnerable. Effects have been documented miles away.
- Damage can range from leaf malformation to total crop loss. It can take up to three years for recovery.
Changing Gears
Two forms of spray drift can damage adjoining crops

• Drift of spray droplets: Small particles can move with the wind, land on grapes, and be absorbed into the grapevines through the cuticle on the leaf. The smaller the droplet, the further it will travel.

• Vapor drift: Volatile herbicides may produce vapors that are carried several miles from the target area. Herbicide particles or vapors may be moved from the application site by wind, shifting air currents, climatic inversions or using high pressures when spraying. Even minute amounts of phenoxy herbicides that move from the application site can create symptoms in grapevines.
Preventing drift

- “The effects of a spray solution once it leaves the nozzle are the responsibility of the applicator!”
  - Montana State University has this statement up front on their website
- Use buffer zones
- Put spray hoods on over the boom

Photo courtesy of Willmar Fab.com
Science of a nozzle

- Nozzle selection is one of the most important factors in reducing pesticide drift!
- They also determine quality of coverage, droplet size and rate of solution per acre.

Sautersprayequipment.com
Science of a nozzle

• Spray droplets are measured in **microns**
  o One micron=1/25,000”
  o Diameter of a paper clip is 850 microns, a human hair is 100 microns

• Spray droplets smaller than 150-200 microns are most likely to move off-target
  o 100 micron droplet can take up to 10 seconds to hit the ground and it could drift up to 44 feet away from where it is supposed to go.
  o 400 micron droplet falls in 2 seconds and will have its chance to drift reduced by 80 percent!
  o The droplet range is measured by the volume median diameter (VMD)
More on the VMD

• Not all drops are created equal!

• What if the droplets are too small?
  o Greater chance of evaporating on its way to the target.
    • Low humidity, high temp conditions can be trouble

• Think like Goldilocks and work to get the droplet size that is just right!

Iowa State University Extension
Science of a nozzle

• Many pesticide labels have instructions designed to help you get your product on correctly. Like the Gramoxone label:
  
  o Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed.
  
  o Application must be avoided below 2mph due to variable wind direction and high inversion potential.
Another label example

Formula 40®

A Selective Herbicide

For the control of many broadleaf weeds in non-crop areas, grass pastures, rangelands and in certain crops. Also for control of trees by injection.

**ACTIVE INGREDIENTS:***

- Triisopropanolamine Salt of 2,4-Dichlorophenoxyacetic Acid* .................................. 34.05%
- Dimethyleamine Salt of 2,4-Dichlorophenoxyacetic Acid* .................................. 21.97%

**Droplet Size**

When applying sprays that contain 2,4-D as the sole active ingredient, or when applying sprays that contain 2,4-D mixed with active ingredients that require a Coarse or coarser spray, apply only as a Coarse or coarser spray (ASAE standard 572) or a volume mean diameter of 385 microns or greater for spinning atomizer nozzles.
Science of a nozzle

- Need to understand what your coverage needs are!

- Increase the flow rate
  - Put more water on per acre

- Use a fan or solid cone
  - Most literature indicates hollow cones are going to drift worse

- One of the easiest ways to reduce drift is lower the pressure
  - May need to change nozzle size to get enough material on at a lower pressure
  - Need to be aware of coverage issues which could arise.
Droplet size requirement is driven by the type of application being made

- **VF**: Very Fine
- **F**: Fine
- **M**: Medium
- **C**: Coarse
- **VC**: Very Coarse
- **EC**: Extremely Coarse

**Foliar Sprays**

**Soil applications**

Sherm Takatori, ISDA
Here is another tool
<table>
<thead>
<tr>
<th>Nozzle Type</th>
<th>Herbicides</th>
<th>Fungicides</th>
<th>Insecticides</th>
<th>Drift Management</th>
<th>PWM Nozzle Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tee Jet Inc.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbo Teejet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>Very Good</td>
<td>Very Good</td>
<td>Very Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbo Teejet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>at pressures below 30 PSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.0 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbo Twinjet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbo Twinjet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>at pressures below 30 PSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.0 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>Very Good</td>
<td>Excellent</td>
<td>Very Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbo Teejet Induction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Induction Turbo Twinjet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Al3070</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>Very Good</td>
<td>Excellent</td>
<td>Very Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XR, XRC Teejet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference pages 12–13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XR, XRC Teejet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>at pressures below 30 PSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.0 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference pages 12–13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>Good</td>
<td>Very Good</td>
<td>Good</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AlXR Teejet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference page 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AI, AIC Teejet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference pages 9–10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Good</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
</tbody>
</table>
Preventing drift

- Carry (and use) a wind gauge
- Don’t spray if winds are more than 10mph
- Be aware of the potential for inversions
- Use the largest droplet size possible
  - The larger the drop, the more reluctance to move
- Know what is downwind
  - Especially if it is not your field!
- Know the product you are spraying
- Use the proper stickers or adjuvants to help reduce drift
Preventing drift

- Know the products your are applying
  - Be aware if it tends to want to wander around
- It is the applicator’s decision if conditions are suspect
  - Get the sprayer booms as low as effectively possible
  - Record wind speed, direction, temperature, time of day and anything else of use
- Use common sense!
Changing Gears
Existing Protections During Applications

WPS Label statement:

- Requirement: “Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.”
  - Who is responsible for compliance: Applicator (handler)
  - Who is protected: Workers & other persons (besides protected handlers)
  - Is the protection limited to the boundaries of the ag establishment? No, it extends beyond boundaries
Two New Protections During Applications in Outdoor Production

1. Ag Employer’s AEZ responsibilities:
   - Requirement (170.405(a)(2)): During an application, the agricultural employer must keep workers and other persons out of the treated area and AEZ that is WITHIN the boundary of the establishment owner’s property.
     - Who is responsible for compliance: Ag employer
     - Who is protected: Workers & other persons (besides protected handlers)
     - Is the protection limited to the boundaries of the ag establishment? Yes
Two New Protections During Applications in Outdoor Production

(2) **Handler’s AEZ responsibilities:**

- Requirement (170.505(b)): Handlers must immediately *suspend a pesticide application* if any worker or other person (other than handler) is in AEZ (170.505(b))
  - Who is responsible for compliance: **Handler/applicator**
  - Who is protected: Workers & other persons (besides protected handlers)
  - Is the protection limited to the boundaries of the ag establishment? **No**
AEZs in Outdoor Production (170.405(a)(1))
AEZs in Outdoor Production (170.405(a)(1))

NO!

Slide courtesy of US EPA
AEZs in Outdoor Production (170.405(a)(1))

• 100 foot AEZ
  o Applied aerially, by air blast or with a spray quality smaller than medium
  o Applied as a fumigant, smoke, mist or fog

• 25 foot AEZ
  o Applied other than above & sprayed from a height of >12 inches from planting medium with spray quality of medium or larger

• No AEZ
  o Applied otherwise
Application Exclusion Zone (AEZ):

- Requirement (170.405(a)(1))
  - The WPS establishes AEZ distances in outdoor production of 25 or 100 feet around the application equipment based on application method
Application Exclusion Zone in Outdoor Production

When the application is concluded, the AEZ no longer exists.
In 1996, NAAREF instituted the Professional Aerial Applicators' Support System (PAASS). PAASS is a program that educates pilots on key safety and drift minimization issues important to flying, modern agriculture and crop protection.

Goals & Objectives
The primary PAASS Program goals are to reduce the number of aviation accidents and drift incidents associated with the aerial application of fertilizers and crop protection products. The National Agricultural Aviation Research & Education Foundation (NAAREF) Board members believe that these goals will be best achieved by providing advanced educational opportunities for all pilots and pilot-operators active in the industry. Specifically, the intent is to develop educational programs that will enhance the commercial aerial
Improving Labels to Reduce Pesticide Drift

Label Instructions to Reduce Drift

We work with pesticide manufacturers through our registration and registration review programs to provide more detailed information about factors that significantly affect spray drift. These factors include:

- Spray droplet size categories.
- Spray release heights.
- Minimum and maximum wind speeds.
- Buffer zones, if necessary.

Adding DRT Instructions to Pesticide Labels

We encourage pesticide registrants to submit applications for including the use of verified drift reduction technologies to their product label use directions. Applications for this label claim must be submitted according to standard requirements and procedures for applications for registration.

Pesticide registration applicants and registrants can choose to label their products for use with both standard application equipment (non-DRT) and DRT-rated equipment or technologies, thus giving the applicator a choice. In this case, labels would have two sets of application restrictions:
Preventing Drift

• For more information about causes of the risk of herbicide damage to vineyards, see the following OSU Extension publication: Preventing Herbicide Drift and Injury to Grapevines

• You are always welcome to ask one of us in the Extension office!
Wrapping up

- Existing public sensitivity
- Wasted product
- Technology is giving us some pretty good tools
- Threat to neighbors’ lifestyle
  - We have more neighbors
Credit Hour Checks

• Looking for the link to your credit report: http://oda.state.or.us/dbs/pest_stat/search.lasso
• You are always welcome to ask us in the Extension office!
License renewals

Welcome to the Oregon Department of Agriculture (ODA) online payment system.

If you are a first time user [click here to register].

UserID

Password

Login

Browser Requirements

Did you forget your password? [Click here to reset your password].

Did you forget your UserID? [Click here to create a new user account].

Need Information? [Program Contacts]
Comments/Feedback Email: mylicense-help@oda.state.or.us
Policies: Refund/Fulfillment Oregon.gov Privacy Statement Fee Schedule
Thank you!

PROCRASTINATION

Hard work often pays off after time, but laziness always pays off now.

william.buhrig@oregonstate.edu