Herbicide / Drift / Grapes
Perspective

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Pesticide Drift can be a VERY Emotional Issue!!

Think, before pointing fingers!

Excellent Resource for Proper Vineyard Spraying

http://www.efffectivespraying.com/

Approx. $61 with postage

2011 NASS Illinois Vineyard & Winery Survey

2011 NASS Illinois Vineyard & Winery Survey

Ranking of Most Challenging Vineyard Management Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>2007 %</th>
<th>2008 %</th>
<th>2009 %</th>
<th>2010 %</th>
<th>2011 %</th>
<th>2012 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease and/or Insect Management</td>
<td>6%</td>
<td>8%</td>
<td>3%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Canopy Management</td>
<td>7%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
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<tr>
<td>Wildlife Management</td>
<td>6%</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Weed Management</td>
<td>8%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Pruning</td>
<td>3%</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>Fertilization and/or Soil pH Adjustment</td>
<td>8%</td>
<td>11%</td>
<td>11%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
</tr>
<tr>
<td>Vine Training and/or Selection of Trellis System</td>
<td>11%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Herbicide Drift</td>
<td>11%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Crop Estimation Before Harvest</td>
<td>11%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Variety Selection for Future Planting</td>
<td>11%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>13%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Percent of Vineyards Reporting Damage and Acres Affected by Herbicide Drift From 2007 to 2011

<table>
<thead>
<tr>
<th>Region</th>
<th>2007 %</th>
<th>2008 %</th>
<th>2009 %</th>
<th>2010 %</th>
<th>2011 %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>Acres</td>
<td>Acres</td>
<td>Acres</td>
<td>Acres</td>
</tr>
<tr>
<td>Northern</td>
<td>5%</td>
<td>7%</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Central</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>South</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Southern</td>
<td>8%</td>
<td>9%</td>
<td>8%</td>
<td>9%</td>
<td>10%</td>
</tr>
</tbody>
</table>

STATE

<table>
<thead>
<tr>
<th>STATE</th>
<th>2007 %</th>
<th>2008 %</th>
<th>2009 %</th>
<th>2010 %</th>
<th>2011 %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>Acres</td>
<td>Acres</td>
<td>Acres</td>
<td>Acres</td>
</tr>
<tr>
<td></td>
<td>92%</td>
<td>92%</td>
<td>92%</td>
<td>92%</td>
<td>92%</td>
</tr>
</tbody>
</table>

* Statistics are based on reported incidents of damage prior to 2011 and percent were calculated using the 2011 vineyard count.
**2011 NASS Illinois Vineyard & Winery Survey**

**Estimated Damage Due to Herbicided Drift from 2007 to 2011**

<table>
<thead>
<tr>
<th>Year</th>
<th>Less than $1,000</th>
<th>$1,000 to $5,000</th>
<th>$5,000 to $10,000</th>
<th>$10,000 to $15,000</th>
<th>$15,000 to $20,000</th>
<th>Greater than $20,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>63%</td>
<td>22%</td>
<td>7%</td>
<td>0%</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>2008</td>
<td>69%</td>
<td>15%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>2009</td>
<td>67%</td>
<td>16%</td>
<td>7%</td>
<td>4%</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>2010</td>
<td>72%</td>
<td>16%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>2011</td>
<td>70%</td>
<td>29%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Percent may not add to 100% due to rounding.

**History of the Big Three**

1941 2,4-D, 2,4,5-T and MCPA Patents filed by Imperial Chemical Industries in England. Patents were not published until 1945 after the war.

1945 2,4-D marketed in U.S. by AmChem for public testing under the brand name “WEEDONE”

1967 Dicamba Introduced by Velsicol Chemical Corporation as Banvel, later manufactured and marketed by Sandoz AG (now Syngenta AG). Now marketed in USA and Canada by BASF, and elsewhere by Syngenta.

1974 Roundup herbicide introduced by Monsanto

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**Current Iowa Law**

- § 21—451.110 Use of high volatile esters. The use of high volatile esters formulations of 2,4-D and 2,4,5-T, the alcohol fraction of which contains five or fewer carbons, shall be prohibited in the counties of Harrison, Mills, Lou, Muscatine and that part of Pottawattamie county west of Range-41 West of the 5th P.M. to become effective upon filing

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**Genetic Engineering Produces 2,4-D Resistant Grape**

10-14-08 University of Illinois announces that Dr. Bob Skirvin has used genetic engineering to produce “Improved Chancellor”, a 2,4-D resistant Grape

Dr. Bob Skirvin, Univ. of I. at Urbana - Champaign

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**Enlist**

- New 2,4-D Choline chemistry to be pre-mixed with glyphosate for GMO herbicide tolerant corn, soybeans and cotton.
- 2,4-D Choline chemistry shown to have 90% less volatility than the conventional 2,4-D low volatile ester
- Available in 2013 for Corn
- Available in 2015 for Soybeans

http://www.enlist.com
Roundup Ready 2 Xtend scheduled for release in 2014 for GMO herbicide tolerant soybeans.

Low volatile dicamba & Roundup & polyplastic polymer in mix to reduce volatility of new dicamba over 90%

**Engenia** – New low volatile dicamba for release in 2014 on soybeans

Engenia will use BAPMA, N, N-Bis-(aminopropyl) methylamine. BAPMA “is a tridentate amine, that provides strong and effective binding of dicamba spray residues.

40% less volatile than current formulations

**Phenoxy Drift**

2,4-D & dicamba (Banvel)

**Phenoxy Herbicide Injury can:**

1. Reduce Yield
2. Reduce Fruit Quality
3. Affect Ripening
4. Reduce Winter Hardiness
5. Reduce Overall Growth
6. Affect Next Year’s Growth
7. Kill the Plant

The dose & timing determines the poison.

**Phenoxy Injury cont….**

2,4-D injury to successive nodes. The dose & timing determines the extent of the injury.

Typical symptom of Dicamba injury causing leaf to cup downwards.

**Phenoxy Symptoms**

Uneven Ripening

Poor Pollination
PHENOXY DRIFT MANAGEMENT

May/June Highest Damage Potential.

Keep dicamba 1 mile away from grapes.

Keep 2,4-D ½ mile away from grapes.
(suggest using 2,4-D amine instead of Low Vol Ester)

Dicamba and/or 2,4-D not a problem from dormancy to bud break.

What is Spray Drift

The EPA defines spray or dust drift as:
"the physical movement of pesticide droplets or particles through the air at the time of pesticide application or soon thereafter from the target site to any non- or off-target site. Spray drift shall not include movement of pesticides to non- or off-target sites caused by erosion, migration, volatility, or windblown soil particles that occurs after application or application of fumigants unless specifically addressed on the product label with respect to drift control requirements."

Supreme Court rejects pesticide trespass 8-1-12 Minneapolis Star Tribune:

Pesticide Drift is Not Trespassing

Pesticide that drifts onto an organic farm is negligence -- not trespassing -- the Minnesota Supreme Court said Wednesday.

Environmental lawyers said the decision provides important clarification of the legal recourse for Minnesotans who have been harmed by drifting pollution, anything from pesticide to soot. Rather than simply proving that drift has occurred, which is what the Appeals Court decided in the pesticide case, plaintiffs must prove negligence and, in order to win damages, they also have to prove harm.

Table 1. Herbicides that have potential to injure grapes.

From: Preventing Herbicide Drift & Injury in Grapes, Oregon State Univ. 3/04
**The Label is the Law!**

**Sensitivity to Herbicide Drift**

Banvel® + 2,4-D may cause injury to desirable trees and plants, particularly beans, clover, flowers, fruit trees, grapes, ornamentals, peas, potatoes, soybeans, sunflowers, tomatoes, and other broadleaf plants when contacting their roots, stems, or flowers. These plants are less sensitive to Banvel® + 2,4-D during their development or growing stage. **FOLLOW THE PRECAUTIONS LISTED BELOW WHEN USING BANVEL® + 2,4-D.**

- Do not apply Banvel® + 2,4-D with roots of desirable plants such as trees and shrubs.
- Avoid making applications when spray particles may be carried by air currents to areas where sensitive crops and plants are growing, or where temperature inversions exist. Do not spray near sensitive plants. Wind is usually in excess of 3 mph and moving in the direction of adjacent sensitive crops. Leave an adequate buffer zone between area to be treated and sensitive plants. Coarse sprays are less likely to drift out of the treated area than fine sprays.

**MODE OF ACTION**

Banvel® + 2,4-D contains two active ingredients: dicamba and 2,4-D. Banvel® + 2,4-D is readily absorbed by plants through shoot and root uptake, translocates throughout the plant's system, and accumulates in areas of active growth. Banvel® + 2,4-D interferes with the plant's growth hormones (auxins) resulting in death of many broadleaf weeds.

**CLEANING SPRAY EQUIPMENT**

Clean application equipment thoroughly by using a strong detergent or commercial sprayer cleaner according to the manufacturer's directions and then triple-rinse the equipment before and after applying this product.
How to reduce the potential of herbicide drift.

Protecting Pesticide Sensitive Crops
Chris L. Arg, Extension Pesticide Education Coordinator, Erin C. Reiss, Extension Entomologist; Craig R. Seppenga, Extension Crop Systems Specialist; Pierre J. Manoux, Extension Agronomist; Andrea R. Wetherbe, Project Coordinator; and Craig L. Romney, Environmental Program Specialist, Nebraska Department of Agriculture.

The Netherlands remains how to protect sensitive crops, such as fruit and specialty crops, from herbicide drift. This guide provides information on the potential for herbicide drift to occur and the steps that can be taken to reduce this potential.

http://www.ianrpubs.unl.edu/republic/live/g2179/build/g2179.pdf

October 2012

Iowa Department of Agriculture and Land Stewardship
Bill Hoffer, Secretary of Agriculture

Sensitive Crop Directory

http://www.agriculture.state.ia.us/Horticulture_and_FarmerMarkets/sensitiveCropDirectory.asp

Iowa Stewardship

http://www.driftwatch.org/

Iowa Stewardship

Misc. Herbicide Drift Injury

Callisto Injury
Pigment Inhibitor

Sulfonylurea Herbicide Injury
Midwest Grape Production Guide

Root Update Herbicide Injury Examples

Gramaxone Injury
Michigan State Univ.

Simazine (Princep) Injury

Michigan State Univ.
Signs are worth a 1,000 words!

Avoid Drift Prone Areas

Buffers R Good!

Share the map of your vineyard with neighbors and Ag Dealers.

Some Grapes Show a Higher Tolerance to Phenoxy Herbicides Than Others

- Brianna
- Cayuga White
- Chambourcin
- Corot Noir
- Espirit
- Frontenac
- GR-7
- LaCrescent
- LaCrosse
- Marechal Foch
- Marquette
- Mars
- Noiret
- Prairie Star
- Seyval
- St. Croix
- Traminette
- Valvin
- Muscat
- Vignoles

But, don’t bet the farm on these ratings!
Table 4. Relative Disease Susceptibility and Chemical Sensitivity among Grape Cultivars.

The relative ratings in this chart apply to an average growing season under conditions usually favorable for disease development. Any given cultivar may be more or less severely affected depending on conditions.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Black rot</th>
<th>Brown rot</th>
<th>Grey mold</th>
<th>Powdery mildew</th>
<th>Rust</th>
<th>Phosphorus</th>
<th>Copper</th>
<th>Calcium</th>
<th>Sulfur</th>
<th>Chlorine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Susceptible or Sensitive to</td>
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Thank You