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UT/UGA
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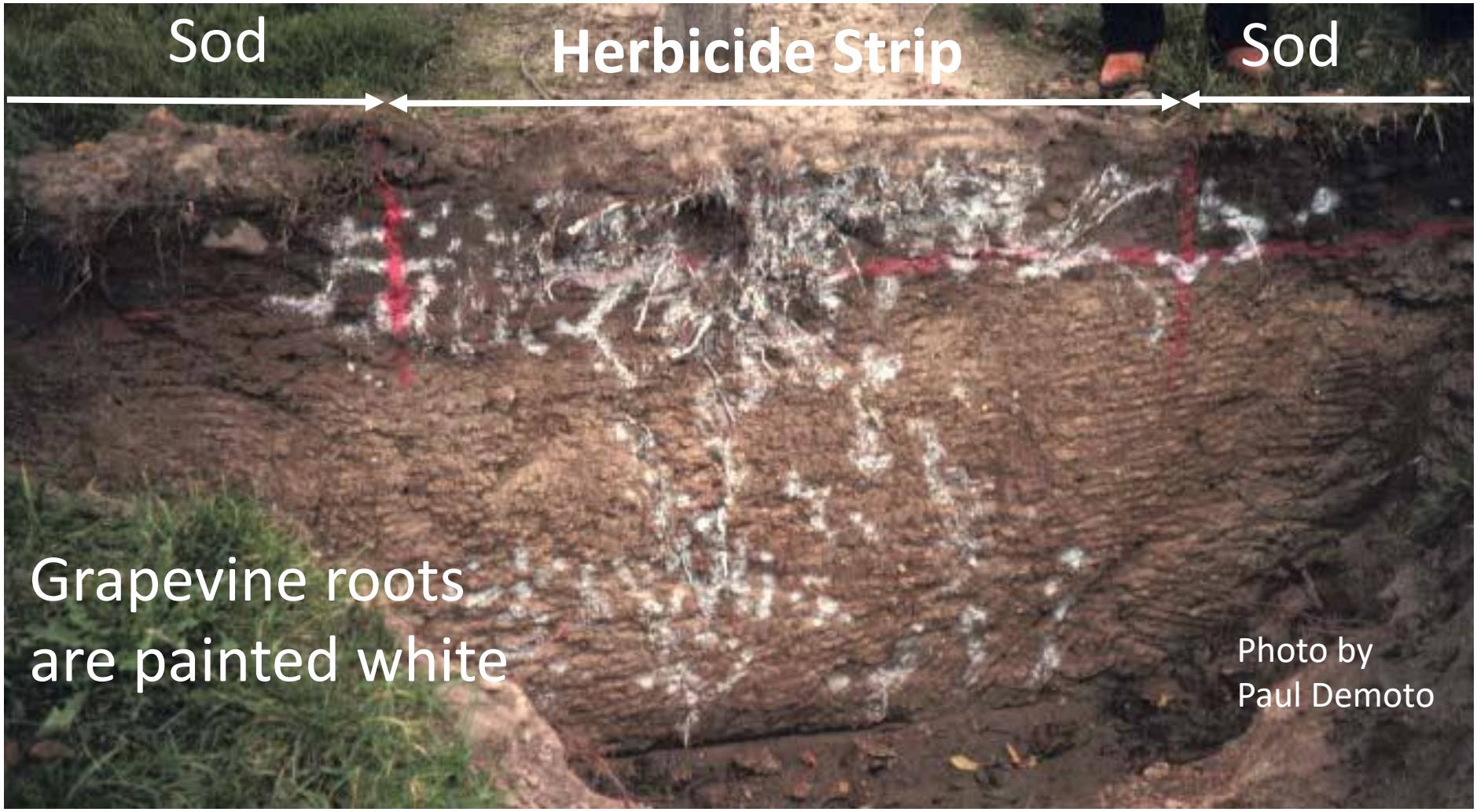
Vineyard Floor Management

Weed Management Goals

- Minimize competition for moisture & nutrients
  - Especially in young vines
- Pest control
  - Elimination of alternate host plants
  - Allow better pesticide coverage
- Maximize air circulation throughout the vineyard
- Erosion control
- Equipment support

Competition



Methods of Vineyard Floor Management

Cultivation

Erosion
Timely
Expensive
Loss of soil moisture
Potential root damage to crop


CF. 90

Cover Crops

- Need to re-establish cover crop annually

Mulching in the row

- Conserves moisture
- Cooler soil temperatures
- Habitat for insects
- Disease potential
- Cost
- Potential for scion rooting on grafted vines

Grass Floor

String Trimmer Damage


K.U.L.T.

Suggested Vineyard Floor Program for Tennessee

- Orient rows across slopes
- Weed-free band under trellis
  - Air flow, grape root borer control, ease of mowing
- Sod strip between rows
  - Deceleration & diffusion strip for runoff water
  - Equipment support
  - Closely mowed for air circulation

Vineyard Floor Management

Soil Characteristics	Vegetation	Temperature benefit
Bare, firm, moist	None	warmest
Moist	Shredded cover crop	0.5º F colder
Moist	Low growing cover crop	1 - 3º F colder
Dry, firm	Freshly disked	2º F colder
Dry to moist	High cover crop	2º F colder

Ground Management Costs

Est./acre costs	Grape Hoe	Herbicide	Flaming
Hours of labor	1 hour	15 minutes	2 hours, 20 min.
Crew	1 person	1 person	3 people
Labor	$15.00	$3.75	$25.00
Tractor fuel & depreciation	$15.00	$3.75	$30.00
Implement depreciation, chemical costs	$2.50	$9.00	$1.00
Total	$32.50	$16.50	$56.00

Matthew Grieshop and Brad Baughman, MSU Dept. of Entomology

Good Weed & Grass Control Depends On:

- The right herbicide(s)
- The right rate
- The right stage of weed/grass development
- Good coverage
- Proper sprayer calibration & operation
- Good sprayer maintenance

Pre-emergence Herbicides

- Applied in late fall to early spring before weed and grass growth begin
  - Selective
  - Non selective

Post-emergence herbicides

- Applied in spring and summer after weed seeds have germinated
  - Contact herbicides
    - Gramoxone
    - Glyphosate
    - Glufosinate
    - Poast
    - Fusilade
    - Select

Terminology

- *Tank mix* – combination of 2 or more pre-emergence herbicides used to attain broader spectrum weed control
- *Surfactants* – wetting agents, foaming agents, emulsifiers

Herbicide Resistance

- Inherited ability of a plant to survive and reproduce following exposure to a dose of herbicide that would normally be lethal to the wild type.
  - May occur due as a result of:
    - Natural selection (random, infrequent mutations)
    - Techniques such as genetic engineering (Roundup Ready)

Herbicide Resistance Management

- MOA = Mode of Action
  - Refers to the specific way in which an herbicide works on plants
  - Examples: Princep (MOA 5), Chateau, (MOA 14), Alion (MOA 29)

Resistance Management Strategies

- Use herbicides with different MOA's during a growing season
- Tank mix herbicides with different MOA's for a given application
- Find at least 2 herbicide programs containg herbicides with different MOA's to rotate on an annual basis
  - Results in less potential for resistance development
  - Gives overall better weed control

Herbicide Sprayer


ANTI DRIFT
NOZZLES
WIDTH & HEIGHT
ADJUSTMENTS
SPRUNG
BREAKBACK

Preplant Site Preparation

- Eliminate noxious weeds
  - Select a non-persistent herbicide
    - Greater # of options in non-cropland
    - Reduced potential for vine damage than with post-plant applications
- Kill strips for vineyard rows
  - Late summer to early fall prior to frost
  - 30 + prior to planting for emerged weeds
- Glyphosate or various generics
  - Surfactant may be needed

Establishment or 1st Year

- If planting into an established sod, apply glyphosate ~ 4 weeks prior to planting for control of cool-season grasses & emerged perennial weeds
- At planting, consider installing grow tubes for vine protection
- Apply herbicides after soil has settled around vine roots

Some herbicides requiring shielding of young vines are:

- Pre-emergents:
  - Chateau
- Post-emergents:
  - Gramoxone
  - Glyphosate

Pre-emergent Herbicides for 1st Year Vines

- Chateau
- Oryzalin (Surflan)
- Prowl
- Casoron
- Goal
- Devrinol

Post-Emergent Herbicides for 1st Year Vines

- Paraquat
- For perennial grasses
  - Poast
  - Fusilade
  - Select

Established Vineyards – Program 1

- Spring PRE + a non-selective POST such as glyphosate or Gramoxone Max
- followed by POST applications of Gramoxone or Rely as needed

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Established Vineyards – Program 2

- Delayed PRE:
  - Spring application of glyphosate prior to bud break (possibly mid to late March)
  - When emerging summere annuals reach 2 to 4 inches tall, use glyphosate plus a PRE (proably somewhere around mid-May

Established Vineyards – Program 3

- Fall/spring split (use where weeds germinate throughout the winter and summer annuals germinate in early spring)
  - Begin with a fall PRE application in combination with a non-selective burn down (Gramoxone Max or Rely) applied after harvest
  - In late spring, use a PRE herbicide + glyphosate for residual summer annual weed control

Established Vineyards – Program 4

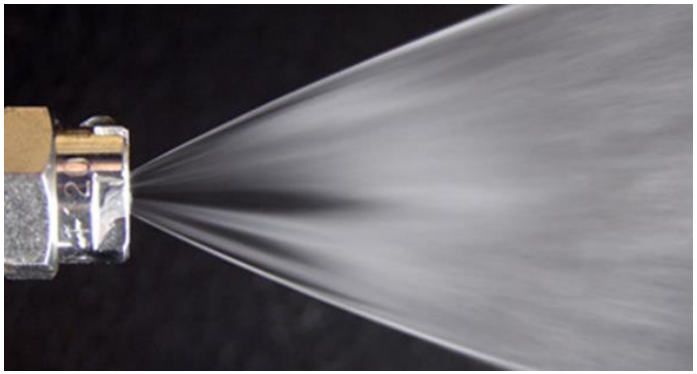
- Spring/summer split:
  - Early spring application of Glyphosate with Chateau (late March)
  - 2nd application of Chateau applied when control from th e1st application is breaking down & emerging weeds are 2 to 4 inches tall (often in early to mid June)

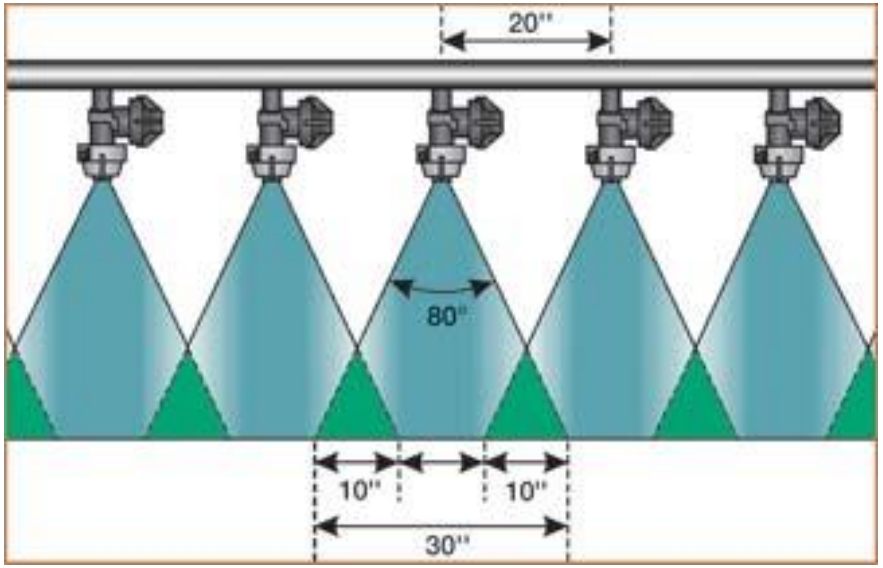
For Bermudagrass and Johnsongrass control, condsider post-emergent applications of Poast, Fusilade or Select as they pose no risk to the crop

Woody perennials (i.e. brambles) are harder to control. Glyphosate applied from flowering through early fall is quite effective (NOTE: grapes are quite sensitive during this time period also so use spot treatments as opposed to broadcast applications)

Herbicide Application Tips

- Low pressure (20 – 30 psi)
- Application rate ~ 20 - 40 gal./treated acre
- Proper nozzle selection and placement
- Large droplet size
- Shielded boom
- Good agitation in tank





Sprayer Calibration

- Lay out a course of known length in the vineyard
  - 220 feet
- Time how long it takes to drive the course
  - Note gear & engine rpm
  - 220 ft. = 2.5 mph (88 ft./min. = 1 mph)
- Measure the width of the spray band at a constant pressure
  - 2 ft. (note: 220 ft. X 2 ft. = 440 ft^2 which is 0.01 acre)
- Catch the sprayer output while driving the course
  - 25.6 oz.
- Calculate amount of spray to be applied to 1 treated acre
  - GPA = (25.6 oz. X 43,560 ft^2/acre) ÷ (128 oz./gal. X 220 ft. strip X 2 ft. wide band)
  - GPA = 19.8
- Repeat several times for accuracy

Calculating the Acres in a vineyard

- Distance between rows (12 ft)

X

Distance between vines in the row (8 ft)

Square feet per vine (96)

- 43,560 ft^2/acre

÷

96 ft^2/vine

454 vines /acre

- # vines in field (1,362) ÷ 454 vines /acre = 3.0 acres in the field

Rate per Treated Acre

- Amount of herbicide to be applied to 1 acre of sprayed ground, not necessarily 1 acre of vineyard
- Example:
  - 12 ft. between rows
  - 4 ft. wide herbicide

  For each acre of vineyard covered, only 1/3 acre of ground is actually sprayed
- In the 3 acre vineyard, you actually be spraying 1 acre of ground with approximately 20 gallons of solution, driving at 2 ½ mph and running the sprayer at a constant pressure (suggest between 20 & 30 psi).

Herbicide Injury Symptoms

Diuron (Karmex)

Princep

2,4-D

Sub-Lethal Glyphosate Injury

Injury late in the growing season may:

- Stop shoot growth
- Result in off- green leaf color
- Be carried over into following year with:
  - Multiple severely stunted shoots emerging from nodes
  - Stunted growth continuing through the growing season or until the vine dies

2,4-D (Phenoxy) Herbicide Damage

Off-Target Movement of Gramoxone

For information on weed control in vineyards, consult:
www.smallfruits.org,
select “IPM/Production Practices”
& then select Bunch Grapes, Southeast Regional Bunch Grapes Integrated Management Guide