



Weed Control Strategies

Grape Camp 2016
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Objectives

- ⦿ Importance & Concerns
- ⦿ Plant Groups
- ⦿ Weed Management Strategies
- ⦿ Herbicide Injury
- ⦿ Resistance

What is a Weed?

- ⊙ Vines
- ⊙ Weeds
 - ⊙ plants growing where they do not belong
- ⊙ Cover Crop
 - ⊙ beneficial living ground cover



Why worry about weeds?

Issues:

- ⊙ water competition (drought)
- ⊙ nutrients - N
- ⊙ sunlight
- ⊙ reduce spray efficacy
- ⊙ harbor pest & disease
- ⊙ contaminate wine
 - ⊙ mechanical harvest



Cover Crop

- ⊙ row middles
- ⊙ typically a sod cover (ryegrass/oats in winter i.e Dormant)

Goal

- ⊙ does not compete excessively
- ⊙ suppresses weeds
- ⊙ erosion control
- ⊙ softens tractor compaction
- ⊙ does not harbor pests/disease



WEEDS

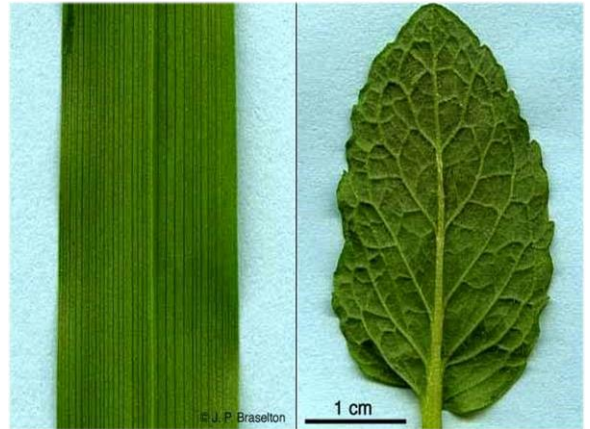
Taxonomic Plant Groups

☉ Broadleaves

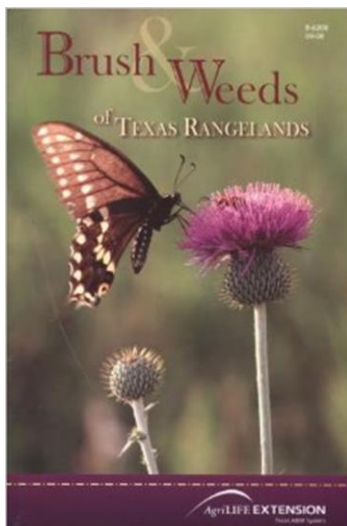
- *wider leaves with reticulate venation*
- dandelions

☉ Monocots

- *narrower leaves*
- parallel leaf venation
- grasses and sedges
- other monocots (wild onion)



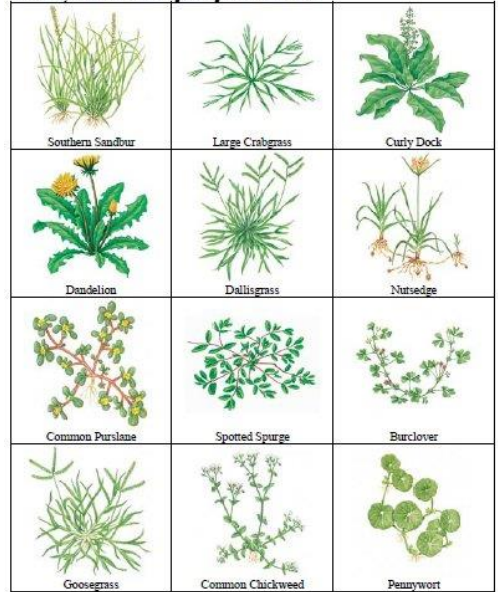
Struggling with weed ID?



Life Cycle Groups

- ⦿ Annuals
- ⦿ Biennials
- ⦿ Perennials

The Following Plates are Drawings of Common Weeds of Texas Vegetable Fields. Drawings are courtesy of Garrison Gardens at garrison-gardens.com/weed.htm



Annuals

- ⦿ live only one growing season
- ⦿ seed only
- ⦿ **Summer annuals**
 - ⦿ germinate in Spring, flower in summer, killed by frost
 - ⦿ grasses, broadleaves, sedges
- ⦿ **Winter annuals**
 - ⦿ germinate in Fall, flower in Spring, killed by heat
 - ⦿ broadleaves and grasses

Annuals

- ⊙ Purslane
- ⊙ Ragweed
- ⊙ Chickweed
- ⊙ Devils Claw
- ⊙ Henbit
- ⊙ Jimsonweed



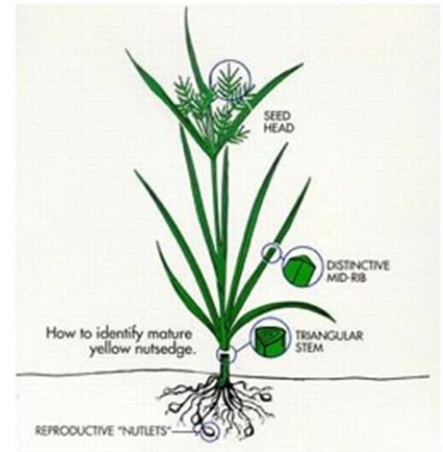
Biennials

- ⊙ live for two years
- ⊙ seed only
- ⊙ broadleaves
- ⊙ may behave as winter annual or short-lived perennial
- ⊙ Ex. some *Thistles and beggars lice*



Perennials

- ⦿ long-lived
- ⦿ *most challenging to control*
- ⦿ Seed
 - ⦿ Ex. *dandelions*
- ⦿ Creeping
 - ⦿ rhizomes, stolons, bulbs, tubers
 - ⦿ Ex. *Nutsedge, many grasses*



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Weed Management

Strategies

- ⦿ Vineyard age
- ⦿ Cultural
- ⦿ Chemical



Pre-Plant

- ⦿ best time to take care of business
- ⦿ control of perennial broadleaves critical
- ⦿ 2 methods of control
 - ⦿ Entire vineyard vs strip spraying

Cultural

- ⦿ repeated tillage

Chemical

- ⦿ pre-plant applications of glyphosate in Summer and Fall
- ⦿ abide by label



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Young Vines

- ⦿ vines most sensitive to weed pressure
- ⦿ inadequate control = poor vine growth
- ⦿ weed free inner-row strip 3-5 feet
 - ⦿ larger the weed free strip
the better the growth



Benefits of a Weed Free Strip

- ⦿ Lessened competition for water and nutrients
- ⦿ Avoidance of trunk damage from mowers
- ⦿ Facilitation of good air drainage around canopy
- ⦿ Minimize harboring of pests



Established Vineyard

- ⦿ row strip can be narrower, if want to reduce excessive vigor
- ⦿ larger range of herbicides at growers disposal
- ⦿ maintenance schedule



Cultural vs. Chemical Control



Cultural Control

- ◎ Old Fashioned Way
- ◎ Newfangled Way



Cultural Control

- ⊙ Hoeing and hand-weeding
 - ⊙ labor-intensive
 - ⊙ ok for small vineyards
 - ⊙ 2-4 weeks during growing season
- ⊙ Mechanical cultivators and weeders
 - ⊙ alternative for in-row weed control
 - ⊙ expensive initial investment
 - ⊙ **must avoid trunk and root injury**
 - ⊙ does have disadvantages



Row Middle Management

What about the row middle?

- ⊙ mechanical mowers and rototillers

Caution when using tillers*

- ⊙ avoid damage to trunks and roots
- ⊙ erosion issues
- ⊙ soil structure and organic matter disturbed
- ⊙ can bring weed seeds to surface
- ⊙ **mow** to suppress vegetation and seed production



Benefits of adding organic matter to soil

- ⦿ Many soils in TX are low in OM
- ⦿ **Source:** Row middle cover crop (mowing or burndown)
 - ⦿ improves soil structure
 - ⦿ promotes microbial populations
 - ⦿ can make bound nutrients more available under high pH soils



Chemical Control

Why use herbicides?

- ⦿ often inexpensive
- ⦿ high level of control
- ⦿ easy to apply when done properly
- ⦿ quick to apply
- ⦿ requires minimal equipment



Sprayer Options

- Backpack Sprayer
- Boom Sprayer
- Controlled Droplet Applicator
- Over the Row Boom Sprayer



Dual Row- Over the Row Boom Sprayer



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Application of Herbicides

- ⦿ Saves time in the vineyard
- ⦿ Saves money
- ⦿ Ensures vine health and productivity
- ⦿ Should use in addition to cultural controls



Helpful Checklist to Determine Volume Output

1. Select your herbicide and check rates for specific weed species
2. Clean out spray tank, lines, and boom
3. Partially fill spray tank with clean water
4. Set sprayer to desired pressure
5. Check nozzles for even pattern and delivery
6. Measure width of spray band
7. Measure off a test area (i.e. 100 linear feet)
8. Determine how long it takes to travel test area in seconds



Part II

- ⊙ With tractor stationary, run pump at same speed and pressure
- ⊙ Measure volume of water delivered from each nozzle in time it took to drive 100 ft.
- ⊙ Determine total volume of all nozzles
- ⊙ You can use this to calculate amount of water volume being applied per treated acre
- ⊙ **(amount of water/area in sq ft. = $x/43,560$) / 128**
- ⊙ x = gal per acre



What it all means

- ⊙ If water output is higher than desired:
 - ⊙ use a higher gear
 - ⊙ decrease pressure
- ⊙ If water output is lower than desired:
 - ⊙ increase nozzle size
 - ⊙ use a lower gear
 - ⊙ increase pressure



Pre-emergence vs. Post-emergence



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Pre-emergent herbicides

- ⦿ applied prior to weed germination
- ⦿ provide residual control for 2-6 months
 - ⦿ the more rain received the shorter the duration
- ⦿ most will NOT control weeds once they have emerged
- ⦿ primarily used to control annual weeds

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Pre-emergence

- ⦿ Must read labels!
 - ⦿ *Diuron* – only 3 year old vines and older
 - ⦿ PHI's & REI's
- ⦿ Choose herbicide based on
 - ⦿ vineyard age
 - ⦿ weed spectrum
 - ⦿ price and availability



Pre-emergence

Timing

- ⦿ often apply in early spring
 - ⦿ soil temps warming up to 55°F
 - ⦿ most must be incorporated via tillage, rain or irrigation (0.5-3")
- ⦿ calibrate spreader/sprayer
- ⦿ apply according to label



Examples of Pre-emergence herbicides

- ⊙ Surflan®
- ⊙ Prowl® — need to apply when vines are dormant
- ⊙ Chateau® — restrictions for vineyards < 3 yrs. old
- ⊙ Goal® — restrictions for vineyards < 3 yrs. old
- ⊙ Devrinol®
- ⊙ Solicam® — vineyard must be in 2nd leaf, needs 3" water

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Post-emergence

- ⊙ applied after weed emergence
 - ⊙ chemicals absorbed by foliage
 - ⊙ have little to no soil activity
- ⊙ often apply post and pre-emergent

Groups

- ⊙ Selective
- ⊙ Non-selective
- ⊙ Contact
- ⊙ Systemic



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Post-emergence

◉ Selective

- ◉ cause little to no vine injury
- ◉ only controls select weeds
- ◉ Ex. *fluazifop* (grass herbicide)



◉ Non-Selective

- ◉ will damage all plants if spray contacts foliage or immature bark
- ◉ directed or shielded sprays often used
- ◉ Ex. *Glyphosate*, *paraquat*, *glufosinate*

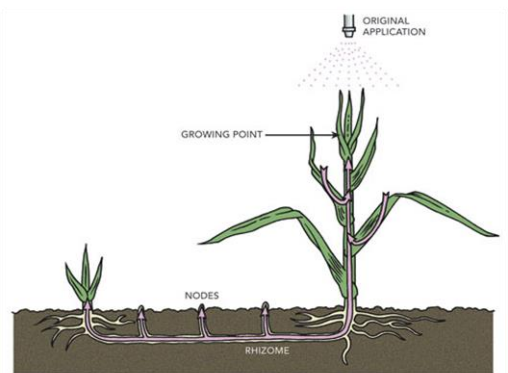


Post-emergence

Contact vs. Systemic

◉ Contact

- ◉ rapid effect on most weed foliage
- ◉ do not translocate to roots
- ◉ more effective on annual weeds
- ◉ may need to apply multiple times to deplete root stores



◉ Systemic

- ◉ slower acting
- ◉ translocate to roots, better for perennial control



Post-emergence

Timing

- apply when weeds are actively growing under good soil moisture conditions
- check label for adjuvant or surfactant recommendations
 - **Adjuvant:** improves herbicide performance
 - **Surfactant:** gives better coverage by breaking down surface tension



Examples of Post-Emergence Herbicides

- *Glyphosate* – many products
- Rely® - *glufosinate*
- Fusilade® - *fluazifop*
- Poast® - *sethoxydim*
- Select® - *clethodim*
- Gramoxone® - *paraquat*



Grow tubes

- ⦿ Assist in protecting young vines from herbicide injury
- ⦿ Can help reduce foraging of rabbits or deer
- ⦿ Can create a greenhouse effect
 - ⦿ remove in Fall (September)



Seasonal Schedule

- ⦿ early season pre-emergent application
- ⦿ mowing and post-emergent to both row and middles
- ⦿ can tank mix
- ⦿ **calibrate your sprayer!**

Acreage Application

- ⦿ Rate is per treated area not entire vineyard acreage
- ⦿ Ex. 3' strip x 10' spacing only 30% of vineyard needs coverage

Herbicide Injury

● Pre-emergent

- injury due to excessive rate
- use lower rate on sandy or gravelly soils

● Post-emergent

- non-selective systemic herbicides pose the risk for vine injury
- *Glyphosate* works great on perennial weeds but also poses a high risk for injury



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Herbicide Injury

Phenoxy herbicides - 2,4-D Drift

- selective (broadleaf control)
- vapor drift major concern
- grapevines extremely sensitive
- never spray in or near vineyard



Phenoxy Herbicides

- ◉ **What to do:**
 - ◉ do NOT apply to the vineyard
 - ◉ calm conditions
 - ◉ low spray pressures
 - ◉ utilize drift control agent
 - ◉ when adjacent vines dormant if possible
 - ◉ use **amine** formulation instead of ester (vapor drift)
 - ◉ talk to your neighbors



Herbicide Resistance

If same regiment used every year

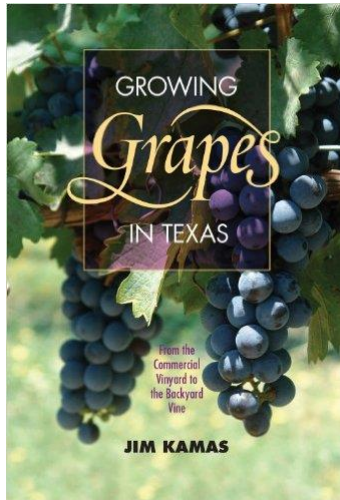
- ◉ species shift towards herbicide-tolerant weeds
- ◉ resistance development
 - ◉ Ex. smooth pigweed to triazine herbicides



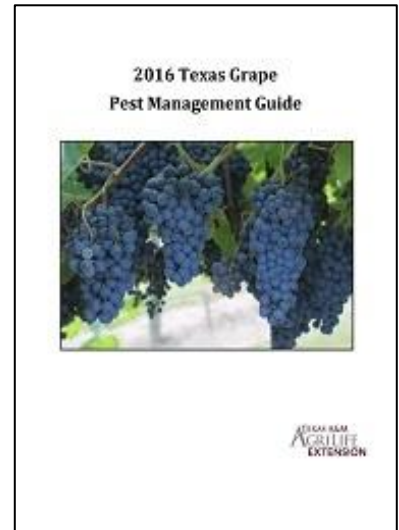
Solution

- ◉ rotate or tank mix herbicides with different modes of action
- ◉ utilize cultural measures not just chemical





Questions?
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