

A photograph of an olive orchard showing rows of trees with a dirt path and a black plastic mulch strip running alongside them. The text is overlaid on the left side of the image.

Olive orchard floor management strategies

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via

Larry Stein

Texas A & M AgriLife Extension















**It takes 80 gallons of water
to grow one pound of weeds**



Weed management makes cents!

Competition for
water &
nutrients

Allelopathy

The inhibition of growth in one species of plants by chemicals produced by another species.

Increased
insect pressure

Harvest & Irrigation
impedance

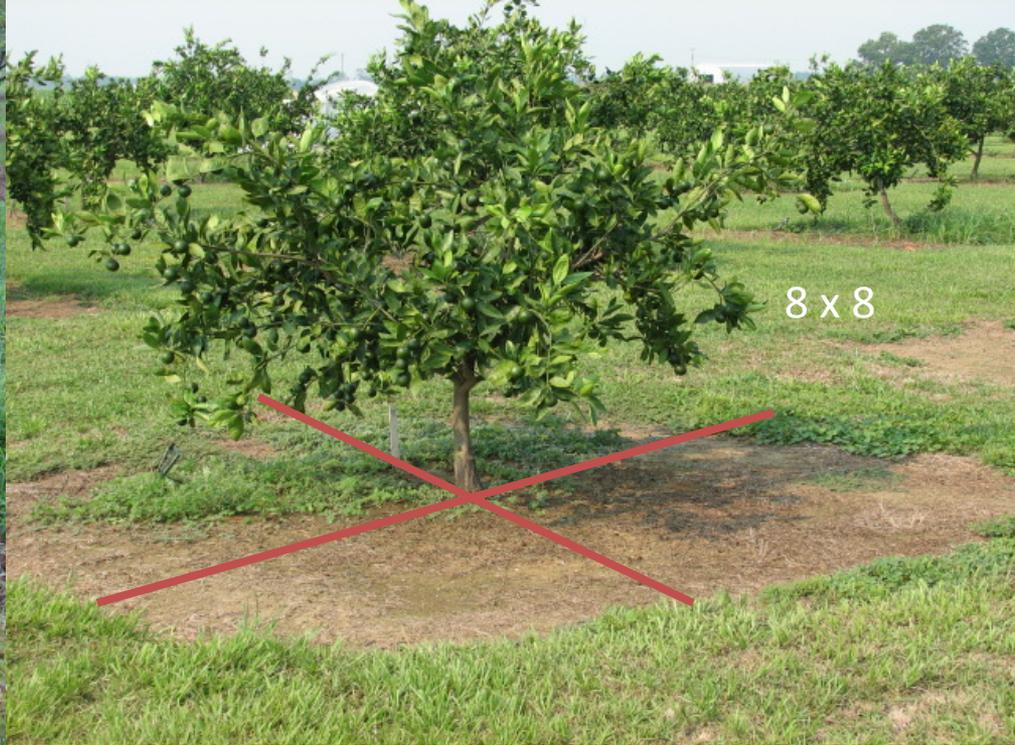


In the beginning of an orchard....



✦ Smith and Wolf, 1999, determined that 1-2 cool season annuals followed by 1-2 warm season annuals in a 120 ft² area around the tree reduced growth from 51%-79%.

➤ Allelopathic effects demonstrated.



The area restricted from weed growth is important: A small 3 x 3 area does not improve growth over no weed control (Faircloth, et al., 2007)

Keep the area free of weeds year-round, including winter.

How Much Weed Free Area?



“Man, farming is hard!” - Texas Olive Grower

Two-way mowing is expensive and infeasible in trellised or close-spaced plantings



Slide credit: Nesbitt



Mulch: Even Better

- (Foshee et al., 1996)
(Alabama): 60% increase in cross-sectional trunk area after three years, compared to weed free checks.
 - 10' x 10' x 12" Chipped Limbs, Leaves, Pine Straw, etc.
- (Smith et al., Oklahoma, 2000) Trunk diameter increase was 36% greater on trees receiving 6' x 6' mulch area for three years vs. weed-free only.



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Mulch alone is not a weed control solution.



slide credit: Nesbitt



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www.weedbadger.com

Biological Control

- Grazing
- Ground Cover Crops
- Mulch



Dual Cropping—Diversity, Fertility cycling

Problems:

Damage to Orchard Trees/plants

Compaction

Food Safety concerns











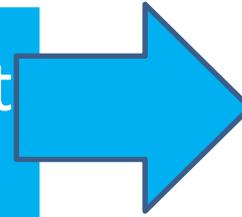




Weed Species Drives Control Tactics



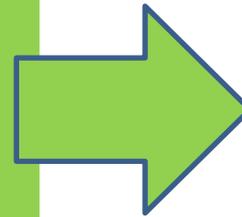
Selective post-emergent herbicides



Control broadleaves in grasses, or grasses in broadleaves while growing.



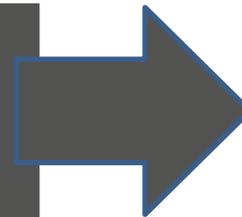
Non-selective post emergent herbicides



Control all emerged weed plants—may or may not have residual activity.



Pre-emergence herbicides



Prevent seedling weed emergence.

Glyphosate

- http://publications.tamu.edu/WEEDS_HERBICIDES/Glyphosate-092018.pdf

The image shows the cover of a publication from Texas A&M AgriLife Extension. The top left corner features the logo for Texas A&M AgriLife Extension. The top right corner has the code 'SCS-2018-11'. The main title is 'General Information About Glyphosate' in a large, bold, white font. Below the title, the authors are listed: Scott Nolte (Texas A&M AgriLife Extension), Peter Dotray (Texas A&M AgriLife Research & Extension), and Muthu Bagavathiannan (Texas A&M AgriLife Research). The cover is primarily blue with a white background for the text.

**TEXAS A&M
AGRI LIFE
EXTENSION**

SCS-2018-11

General Information About Glyphosate

Scott Nolte-*Texas A&M AgriLife Extension*; Peter Dotray-*Texas A&M AgriLife Research & Extension*; Muthu Bagavathiannan-*Texas A&M AgriLife Research*

What is glyphosate

Glyphosate is an herbicide used to control a wide range of undesirable plants in lawns and gardens, row crops, pastures, aquatics, road sides, rights-of-way, and other managed areas. First introduced for use in 1974, glyphosate is now one of the most widely used herbicides in the United States. Today, there are over 750 products that contain this active ingredient for agronomic, commercial, and home use.

How does it work

Glyphosate kills a wide range of annual and perennial plants (grasses, broadleaves, and sedges) by preventing them from making 3 essential aromatic amino acids. It does this by inhibiting a specific enzyme, EPSP synthase, only found in plants and many bacteria.

Is it likely that glyphosate can cause cancer

Regulatory agencies charged with the risk assessment of substances and their impact to the public including Health Canada, European Food Safety Authority (EFSA), Food and Agriculture Organization (FAO) of the United Nations, World Health Organization (WHO), and the United States Environmental Protection Agency (US-EPA), all released findings of their assessments later in 2015, 2016 and 2018. Based on the most currently available research, these agencies have all concluded that glyphosate was unlikely to pose a carcinogenic risk to humans.

The International Agency for Research on Cancer (IARC) is a non-regulatory working group that considers current published research to determine if substances are potential carcinogens. In March 2015, IARC classified glyphosate as Group 2a “probably causes cancer”. IARC only assesses the potential carcinogenicity of a substance and does not consider exposure or conduct risk assessment.

INTEGRATION

Connect to the industry's most up-to-date information.

Call 800.237.2367 or
Email sales@cdms.net



SEARCH

Product Name

Product Name

OR

Common Name

Common Name

OR

Product Type

Herbicide - Weeds

Crop

olives

Pest 1

Pest 1

Pest 2

Pest 2

Manufacturer

-- Select One --

State

Texas

Organic Products Only

Clear All

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Filter(s):

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Product List

Search results: 151 product(s) found

Abundit™ Extra (Exclusively Distributed by DuPont) Corteva Agriscience United States 71368-20	Aceto Diquat 2L AG Aceto Agricultural Chemicals Corporation 2749-530	Aim® EC Herbicide FMC Corporation 279-3241
Alion® Herbicide Bayer CropScience 264-1106	Arrow® 2 EC ADAMA 66222-60	Avatar S2 Innvictis Crop Care, LLC 89168-11-89391
Avatar™ Innvictis Crop Care, LLC 89168-11-89391	Axxe® BioSafe Systems, LLC 70299-23	Basagran® Herbicide Arysta LifeScience North America LLC 7969-45-66330
BotaniGard® Maxx BioWorks, Inc. 82074-5	Brandt® Ecotec® Plus Brandt Consolidated EXEMPT	Broadloom® Herbicide UPL NA Inc. 70506-306
Buccaneer® (55467-10) TENKOZ, Inc. 55467-10	Buccaneer® 5 Extra TENKOZ, Inc. 55467-15	Buccaneer® Plus (55467-9) TENKOZ, Inc. 55467-9
Chateau® Herbicide SW Valent U.S.A. LLC Agricultural Products 59639-99	Cheetah® Herbicide Nufarm Agricultural Products 71368-112	Cinco™ Loveland Products, Inc. 34704-929
Cleanse™ 2 EC WinField United 83222-30	Clethodim 2 EC Herbicide Agromarketing Company, Inc. 87845-7	Clethodim 2E Albaugh, LLC/Agri Star 42750-72
Clethodim 2E RedEagle International LLC 85678-23	Collide™ Herbicide UPL NA Inc. 70506-295	Cornerstone® 5 Plus WinField United 1381-241
Cornerstone® Plus (1381-192) WinField United 1381-192	Cornerstone® Plus (524-454-1381) WinField United 524-454-1381	Credit® 41 Nufarm Agricultural Products 71368-20

Non-selective post emergence

- Glyphosate (Roundup, various generics); systemic kill; uptake through leaves & other green tissue.
- Paraquat (Gramoxone Inteon); contact kill only-burns weeds down.
- Glufosinate (Rely) avoid contact with foliage or trunks until tough, brown-colored bark has developed.

Glufosinate



GROUP 10 HERBICIDE

FORFEIT 280

A non-selective herbicide for post emergence broadcast use on canola, corn, cotton, and soybean designated as LibertyLink®. Forfeit® 280 may be used for weed control in non-LibertyLink cotton when applied with a hooded sprayer in-crop. Forfeit 280 may also be applied as a broadcast burndown application before planting or prior to emergence of any conventional or transgenic variety of canola, sweet corn*, corn, cotton, olive, rice*, soybean, or sugar beet. Forfeit 280 may be used for post emergence weed control in listed tree, vine, and berry crops. Forfeit 280 may also be applied for potato vine desiccation.

*Not for use in California.

ACTIVE INGREDIENT:

Glufosinate-ammonium*	24.5%**
OTHER INGREDIENTS:	75.5%
TOTAL	100.0%

*CAS Number 77182-82-2

**Equivalent to 2.34 pounds of active ingredient per U.S. gallon.

KEEP OUT OF REACH OF CHILDREN WARNING — AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID	
If on skin or clothing:	<ul style="list-style-type: none">• Take off contaminated clothing.• Wash skin immediately with plenty of soap and water.• Get medical attention.
If in eyes:	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Get medical attention if irritation develops or persists.
If swallowed:	<ul style="list-style-type: none">• Rinse mouth thoroughly with plenty of water.• Do not induce vomiting.• Get medical attention immediately.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. FOR A MEDICAL EMERGENCY INVOLVING FORFEIT 280 CALL: 1-866-944-8565. Note to Physician: If ingested, endotracheal intubation and gastric lavage should be performed as soon as possible followed by charcoal and sodium sulfate administration.	

EPA REG. NO. 34704-1080

EPA EST. NO. 34704-MS-001

NET CONTENTS 2.5 GAL (9.46 L)

Selective post emergence

- Sethoxydim (**Poast**); controls annual & perennial grasses
- Fluazifop-P-butyl (**Fusilade DX**) controls annual & perennial grasses
- Clethodim (**Select**); controls grasses (non-bearing fruits only)







Venue Herbicide



- Non-selective contact herbicide, especially good for Control of Broadleaf Weeds in Non-bearing and Bearing Orchards
- Can be used for sucker management.
- Will Burn Back Green, Non-callused tissue

Approved Crops

- | | |
|---|---|
| <ul style="list-style-type: none">• Dates• Feijoa• Figs• Grapes• Kiwi fruit• Mango• Olive trees | <ul style="list-style-type: none">• Persimmons• Pome fruits• Pomegranates• Stone fruits• Tree nuts• Nonbearing fruit, tree vines |
|---|---|

OMRI Approved Non-selective, burn-down herbicides

SUPPRESS®

HERBICIDE EC FOR ORGANIC PRODUCTION

**A Contact, Post-Emergent
Non-Selective Herbicide
for Use in Agricultural
Food and Non-Food Crops**

Active Ingredients:	
Caprylic Acid.....	47%
Capric Acid.....	32%
Other Ingredients:	21%
Total	100%

**KEEP OUT OF REACH OF CHILDREN
WARNING/AVISO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

See inside booklet for First Aid and Precautionary Statements

SHAKE WELL BEFORE USING • APPLY WITH CONTINUOUS AGITATION

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OMRI LISTED
For Organic Use

EPA Reg. No. 51517-9
EPA Est. No. 51517-CA-1



Slide credit: Nesbitt

Shown as example: Product Endorsement not implied.

What about vinegar?



- Is it a synthetic acetic acid or natural vinegar produced by fermentation?
- Determine and document intended use: adjuvant or weed control.
- For weed control, obtain documentation from the supplier that it is non-synthetic.
- Using a synthetic >8% is violation.

Slide credit: Nesbitt

Important Fruit & Nut Herbicides

- Pre-Emergence
- Oryzalin (Surflan, various generics); very safe
- Pendimethalin (Prowl); broadleaf and grass prevention
- Norflurazon (Solicam); good summer weed prevention. Use caution on coarse-textured soils for some crops. Provides some nutsedge prevention

Newer Pre-Emergence Herbicides- Nonbearing Trees

- **Flumioxazin (Chateau)**- Apply Only After All Air Pockets Have Been Filled In Newly Planted Orchards. Excellent Control of Both Germinating Broadleaves and Grasses. Needs Rainfall Within 21 Days of Application
- **Isoxaben (Gallery, Trellis)**- Control of Germinating Broadleaves Only. Needs Rainfall Within 21 Days of Application

A granular product, easy to hand-broadcast around young plants

- Contains Treflan (trifluralin) and Gallery (isoaxaban)
- Labeled only for non-bearing trees



Slide credit: Nesbitt

2 – 4 D



- Effective post-emergent control for broadleaf weeds in sod, turf or pasture situations.
- Can deform, stunt, and kill fruit plants and trees if sprayed on foliage or volatilization and wind drift moves to foliage.
- High temperatures (>85 F) and windy conditions are absolute disaster for orchards!
 - “2-4D-Ready Cotton” could cause problems for orchards.
- Dormant season use with low volatile forms (Amines) under calm wind conditions can be used with success.











Cover Crops

- Benefits:
 - Plant/insect diversity
 - Nutrient building/scavenging
 - Increased soil health?
 - Decreased soil erosion
 - Increase Organic Matter?
- Costs:
 - \$\$\$: seed, labor, diesel,
 - Success not guaranteed
 - Uses water

Cover Crops

- NRCS: 200,000 lbs of organic material per acre
 - 1% increase in soil OM
- Legumes: nitrogen assimilation
 - 50-150 lbs/acre
 - Needed?
- Increased water infiltration
 - Deep-rooted crops



Cover Crops

- Basics
 - Seedbed prep
 - Clean-tilled
 - No-till
 - Pre-plant fertilizer?
 - P and K
 - GOOD SEED/SOIL CONTACT
 - Imperative for germination
 - Firm seedbed
 - Rolling?
 - Plant in anticipation of rain
 - Proper species selection
 - Local Extension/NRCS



Summary

- Weed management is an ongoing challenge for all fruit growers.
- No one system works exactly the same for every orchard, due to inherent differences in weed populations, soil types, rainfall, irrigation method etc.
- Herbicide resistance (especially to glyphosate) is a growing problem.
- An integrated approach to weed management, avoiding reliance on one method of chemical weed control should be considered.
- Cover crops can be beneficial, but costs should be weighed with benefits



Slide credit: Nesbitt