

Pest, Disease, and Weed Management in Vegetable Gardens



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COVID-19 Resources and Information

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Food Safety

Health & Wellness

Youth & Family

Natural Resources

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News and Updates



NC 4-H Daily SPARK - April 6-10 Schedule

We are excited to announce the line up for NC 4-H Daily Spark for the week of April 6th. ...

North Carolina 4-H **FEATURED**



NCDA&CS Taking Preventive Measures to Help Farmers and Agribusinesses

The N.C. Department of Agriculture and Consumer Services (NCDA&CS) is taking preventive measures to help farmers and



COVID-19: Farming Resources

PAGE TOPICS (This page is updated every Wednesday evening. Last update 04/01/2020) Introduction General COVID-19 Knowledge How Can I Help My Community? Food Safety Staff ...

<https://covid19.ces.ncsu.edu/>

NC STATE

EXTENSION

Vegetable Gardening Resources

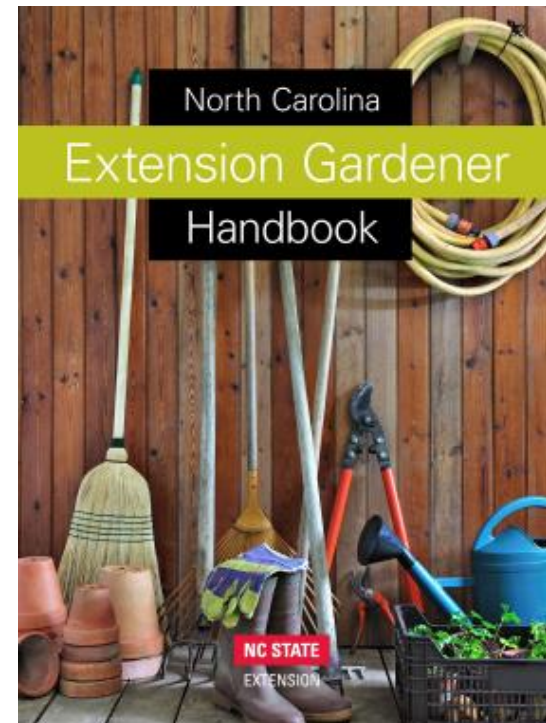
- **For this class:** <https://go.ncsu.edu/chathamveggies>
- **Gardening Portal:** <https://gardening.ces.ncsu.edu/>
- **Extension Gardener Portal:** <https://extensiongardener.ces.ncsu.edu/>

Subscribe to the Chatham Gardener Newsletter

- Sustainable gardening information
- Monthly articles written by Master GardenerSM Volunteers
- Upcoming classes and events
- **To subscribe:** email me at matt_jones@ncsu.edu

Extension Gardener Handbook

- Available online for **FREE**
<https://content.ces.ncsu.edu/extension-gardener-handbook>
- Full-color, hardback copy available from UNC Press (\$60)
- See chapters on [Soils](#), [Vegetable Gardening](#), [Organic Gardening](#), and [Composting](#)

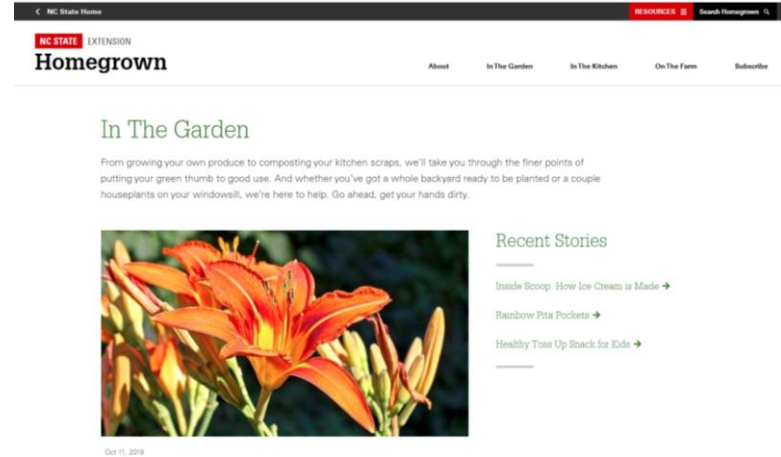


Resources

NC State Extension Homegrown

<https://homegrown.extension.ncsu.edu>

- In the Garden Videos
- In the Kitchen Videos
- On the Farm Videos

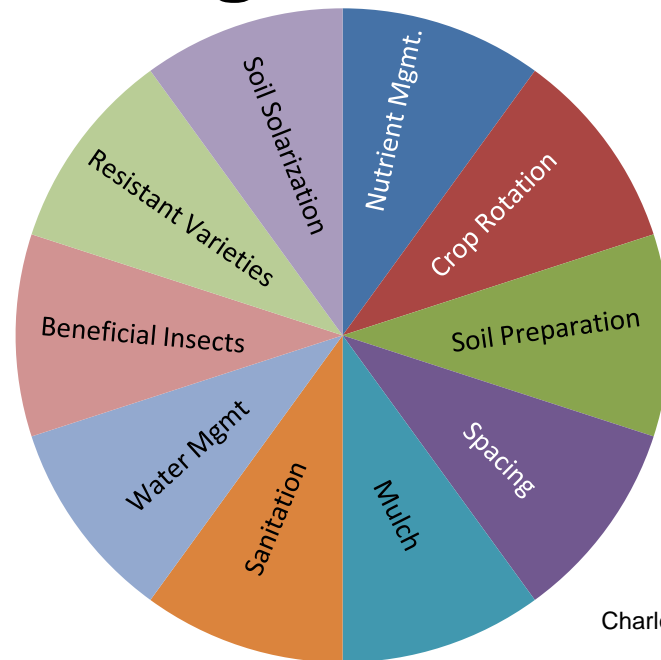


Part 1a

Integrated Pest Management

IPM Treatment Strategies

- **Plant Health Management**
 - Reduce plant stress
 - Build healthy soils
 - Practice sanitation
 - Proper plant selection
- **Encourage beneficial insects**
- **Use pesticides as last resort**
 - Use less toxic options



Charlotte Glen

Reducing Plant Stress

Stress

- Reduces photosynthesis
- Reduces growth
- Reduces production of protective compounds
- Attracts pests

Stressors

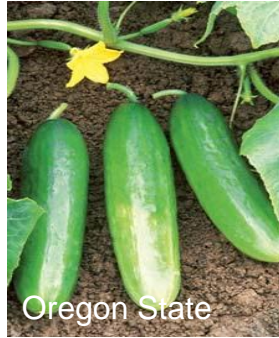
- Too dry or wet
- Soil pH
- Inadequate or excessive nutrients
- Planted too deep
- Soil compaction



Light Requirements

Hours of Direct
Sun per Day

8-10



Fruit Crops

6-8+



**Leaf and
Root Crops**

All vegetables need at least 6-8 hours of direct sunlight per day

Reducing Plant Stress

Build Healthy Soils

- Healthy soils support beneficial microbes
- Get soils tested
- Manage nutrients & pH
- Add organic matter
- Alleviate soil compaction



Reducing Plant Stress

Water Management

- To reduce leaf diseases, avoid wetting leaves
- Fungal leaf diseases require 4+ hours leaf wetness to infect
- Overwatering can lead to root rot
- 1-1.5" of water equivalent per week
- Moisten soil to 8" depth



Reducing Plant Stress

Proper Spacing

- Plan for mature size
- Allow air flow between plants to promote drying & prevent disease
- Allow adequate space to minimize:
 - Competition for water, nutrients, and light
 - Habitat for pests



Handpicking & Sanitation

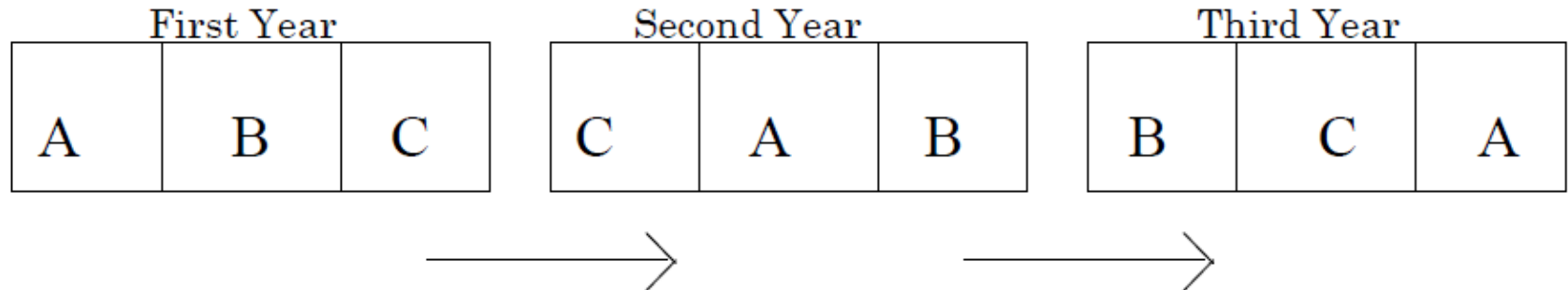
- Inspect plants for egg clusters and insect pests
- Squish or drop them in soap water
- Remove diseased leaves early
- Weeds can harbor pests



Squish Squash Bug Eggs

Crop Rotation

- Avoid planting crops in the same family in the same location
- **Minimum 3 year** rotation ideal
- Include **cover crops** in rotation
- Requires **planning and record keeping!**



IPM Best Practices

Planting Dates

- Vegetables/Annuals
- Avoid heat and cold stress
- Avoid known pest problems by planting early or late.



Plant squash early to avoid vine borers which become active in June

Exclusion

- Floating row covers can keep **flying adult insects** from laying eggs on vegetables
- **Will also keep out pollinators** – not an issue for leafy crops
- **Cover when insects are active** – stake down edges
- Lay directly onto crop or install PVC supports

<https://wimastergardener.org/article/floating-row-cover/>



Part 1b

Weed Management

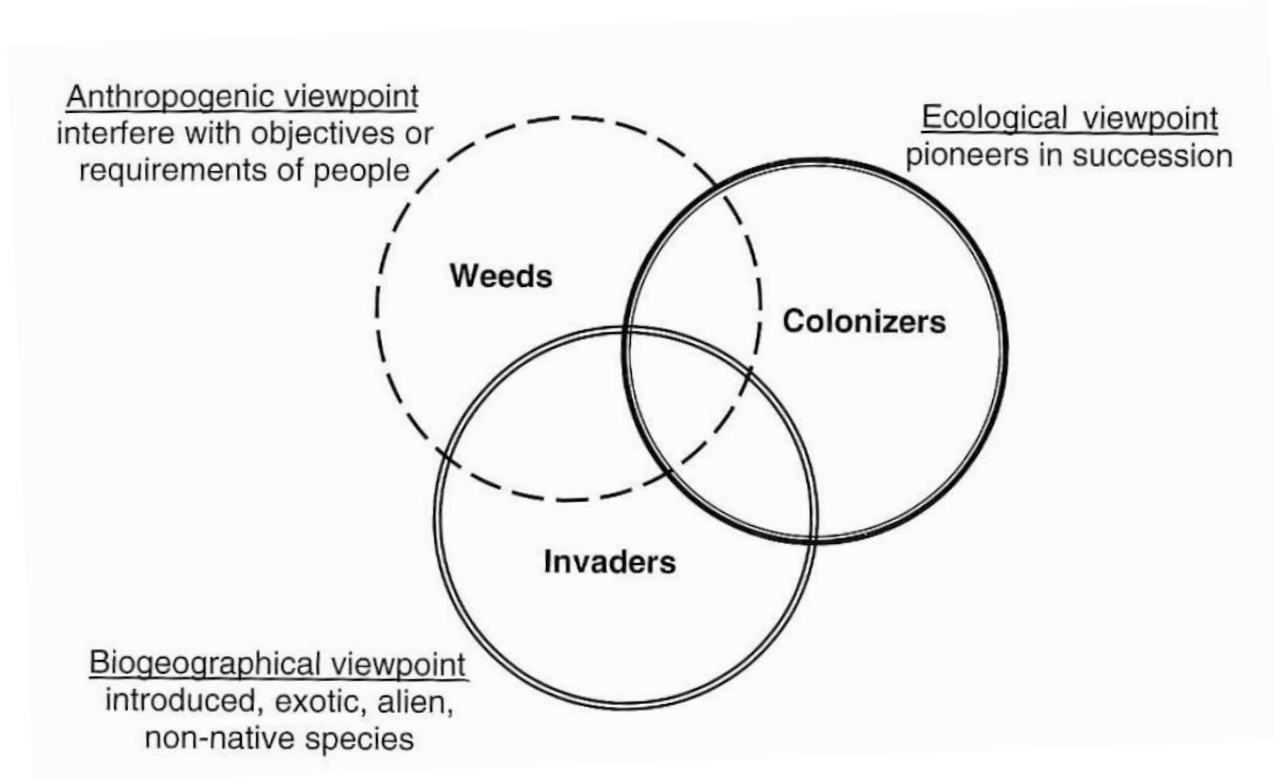
What are weeds?

- “A plant out of place”
- A non-desirable plant in an agricultural or landscape setting
- Not a taxonomic group
- Context-dependent



Taraxacum officinale (Asteraceae)

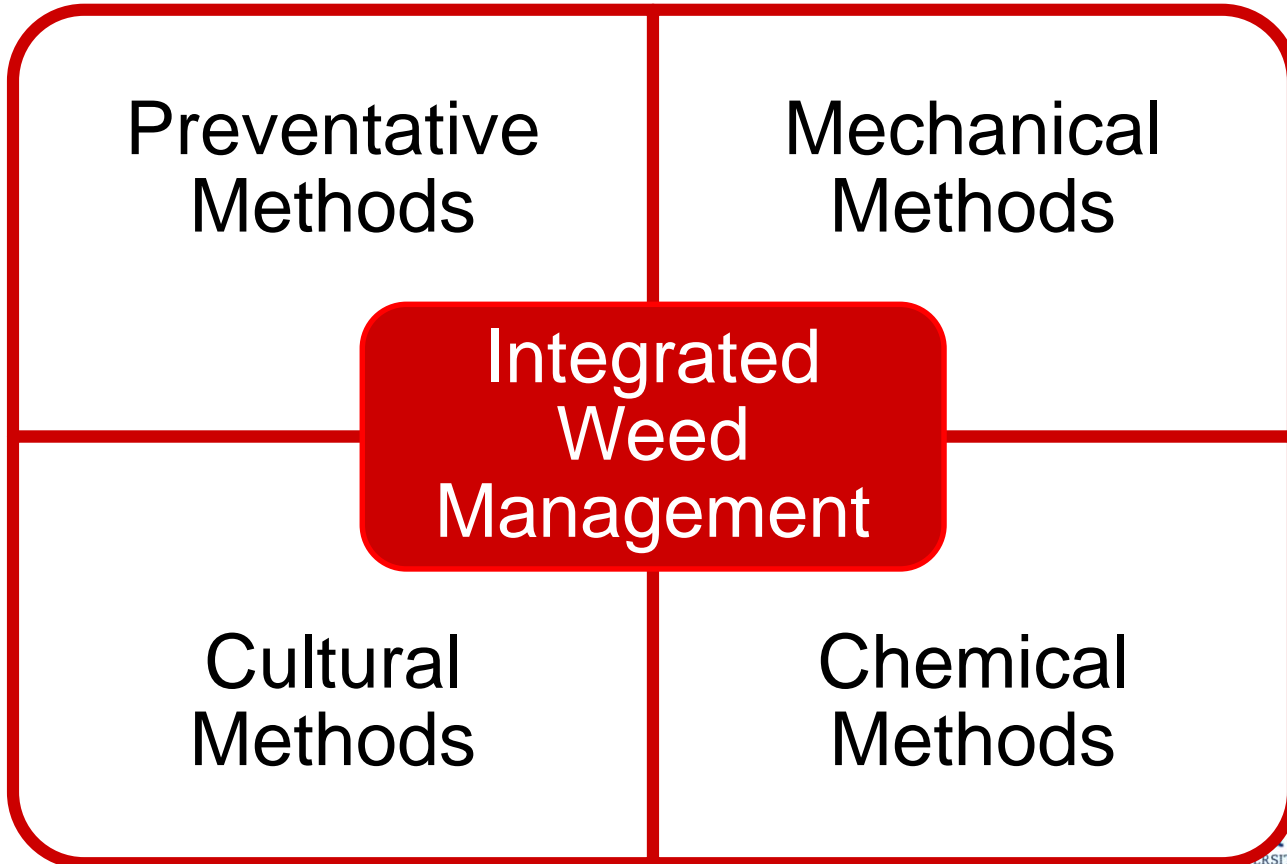
Weed Classification



| Crop | Weed | Density | Yield loss | Reference |
|-------------|---------------------------|--------------------|----------------|-----------|
| Bell pepper | Purple nutsedge | 200/m ² | 32% | 151 |
| Broccoli | Common lambsquarters | 1/m ² | 22-37% | 20 |
| Broccoli | Common lambsquarters | 15/m ² | 73% | 20 |
| Broccoli | Italian ryegrass | 4.9/m of row | 3.6% | 14 |
| Broccoli | Italian ryegrass | 600/m of row | 100% | 14 |
| Cabbage | Wild radish | 16/m of row | Not detectable | 225 |
| Cucumber | Mix of weeds ¹ | 11/m ² | 46% | 80 |
| Cucumber | Yellow nutsedge | 15/m ² | 5% | 113 |
| Tomato | Mix of weeds ¹ | 9/m ² | 27-62% | 81 |
| Tomato | Barnyardgrass | 16/m of row | 26% | 18 |
| Tomato | Barnyardgrass | 64/m of row | 84% | 18 |
| Tomato | Common lambsquarters | 16/m of row | 17% | 19 |
| Tomato | Common lambsquarters | 64/m of row | 36% | 19 |
| Tomato | Purple nutsedge | 80/m ² | 14% | 115 |
| Tomato | Purple nutsedge | 160/m ² | 68% | 115 |
| Tomato | Purple nutsedge | 320/m ² | 70% | 115 |
| Tomato | Purple nutsedge | 200/m ² | 44% | 151 |

Veggies are Poor Competitors Against Weeds

¹ Weed mixture included common lambsquarters, common ragweed, and longspine sandbur



Weed Management **Prevention**

Control or clean vectors of weed propagules

- Seeds
- Stolons/Rhizomes
- Roots
- Bulbs



Hand Weeding

Mechanical Methods

- Labor intensive
 - Don't be lazy!
- Optimal for annual weeds
- Remove Roots



Weeding Knife = Matt's friend

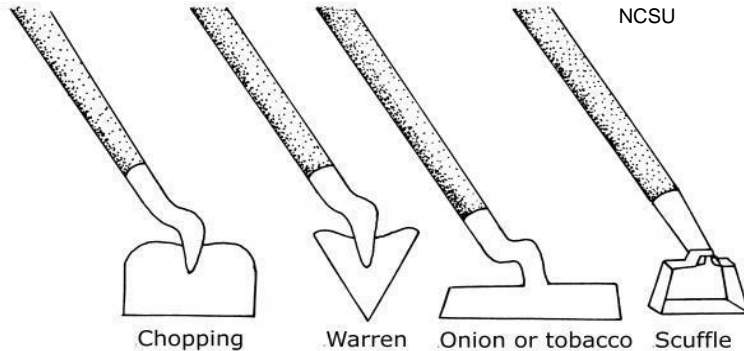


Hand Weeding

Mechanical Methods

Hoeing and Tilling

- Target young annual weeds
- Be a 'shallow hoe(r)'
- What would happen to perennial weeds?



Matt's only
other friend

False Seedbeds

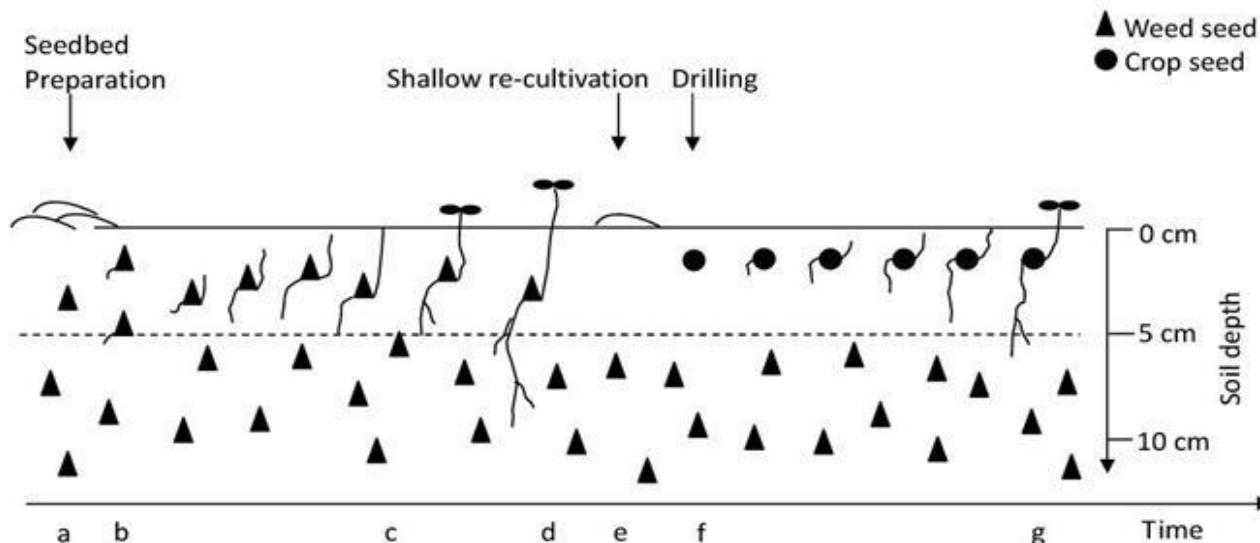
1) Prepare bed normally

2) Allow weeds to germinate

3) Kill weeds

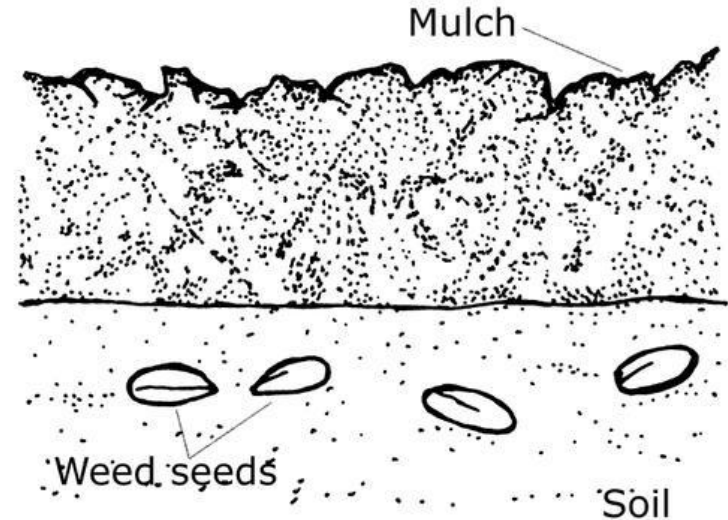
- Scuffle Hoe
- Herbicide

4) Plant desired plants



Mulches

- Reduce weed growth
- Conserve moisture
- Affect Soil Temp.
 - Moderate
 - Modify
- Organic
- Inorganic



Not Ideal for Veggies



Mulch Around Beds



Matt Jones
NC State Extension

Plastic Mulch

- **Most effective mulch**
- **Not recyclable, photodegrades**
- **Expensive**
- **Difficult set-up**

Types

- Black Plastic
- White Plastic
- Porous
- Landscape fabric

<https://extension.usu.edu/productionhort/files-ou/Use-of-Plastic-Mulch-for-Vegetable-Production.pdf>



Organic Mulches

Paper

- Effective in thin layers
- Available for garden use (in rolls like plastic)
- Readily available
- **Expensive (garden rolls)**
- **Unsightly (newspaper)**



Organic Mulches

Leaves

- Attractive
- Add organic matter
- Can mat down
- Can blow away

Compost

- Adds organic matter
- Some weed suppression
- Even better at growing weeds!
- Better to use as an amendment

Organic Mulches

Hay or Straw

- Attractive and effective
- Readily available (rural)
- Source of weeds (hay)
- Herbicide contamination
- Expensive (straw)

Grass Clippings

- Readily available
- Can blow away
- Herbicide contamination
- Allow to dry
- Better to leave on lawn

Organic Herbicides

- Weeds difficult to control in organic production
- Mostly preventative, cultural, and mechanical control
- Acids and oils
- Contact, non-selective



ECOBlend[®]
Made with Vegetable Oils

Weed Control PRO

Post-Emergent Herbicide For Organic Production

For use in Agricultural Crops, Residential, Aquatic, Industrial

- **SELECTIVE (see back panel) or TOTAL VEGETATION CONTROL**
- **BIODEGRADABLE, REPLANT WITHIN 1 WEEK**
- **BREAKS DOWN PLANT MASS INTO BENEFICIAL SOIL NUTRIENTS**
- **SAFE FOR WATER, FARMS, RESIDENTIAL AREAS, NO POISONS**

SEE BACK LABEL FOR SELECTIVE WEED CONTROL APPLICATION AND PRECAUTIONARY STATEMENTS

Manufactured by HOMS, LLC
(www.homs.com)

| | |
|---------------------------------------|------------------------------|
| *Other Ingredients: Water, Soap | Active Ingredients: |
| LISTED BY OMRI FOR ORGANIC PRODUCTION | Soybean Oil 16% |
| | Citric Acid 5% |
| | Other Ingredients* 79% |
| | Total 100% |

64 oz
 2.5 gal
 55 gal
 270 gal

Just because its natural, doesn't mean its safe to handle!

- **DANGER:** Causes irreversible eye damage. Wear goggles or face shield.. Harmful if absorbed through skin. Harmful if swallowed. Do not get in eyes, on skin, or on clothing. In case of contact, immediately flush eyes or skin with plenty of water.
- PPE required: eye protection, water proof gloves, etc....

My recommendation?

Weed frequently by hand!

