Organic Options in Landscape Weed Management

- Site Preparation – without herbicides, some weeds will be more difficult to manage after planting
- Sanitation & Exclusion
- Preemergence strategies
- Postemergence strategies

Site Preparation

- There are basically four options:
  - Dig it up?
  - repeated cultivation,
  - Solarization
  - Natural postemergence herbicides are generally ineffective (we'll discuss this later)

Dig it up??

- It will work for some, like dandelion, but not creeping perennials

Florida betony tubers
~ 12 inches deep

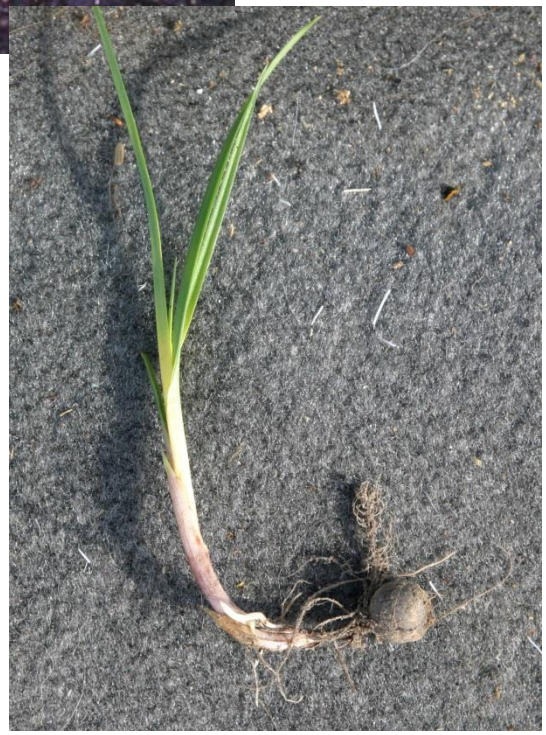
Bindweed roots may reach 20 ft

Controlled by repeated cultivation

Dandelion

Goldenrod

Other weeds are spread by cultivation



Alternatives to Chemical Fumigants

- Steam
- Solarization

Steam – its possible, but expensive

Solarization

- Cover soil with clear plastic
- Solar energy is trapped. Soil is heated.
- Try to reach at least 140 F for several days
- Only works in summer
- Generally takes ~ 6^{+} weeks
- Works on small-seeded annuals, but generally not very effective on perennials or large-seeded annuals

Solarization is generally not as effective as chemical fumigants

Chemical fumigant

Solarized then sprayed with glyphosate

Sanitation

- Once you have the area “clean”, prevent introduction of weed propagules

How we introduce and move weeds

- top soil
- organic amendments
- equipment
- plants

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Preemergence weed control options

- Mulches prevent germination and establishment by excluding light
- Natural preemergence “herbicide” products?

Mulches : #1 defense against annual weeds

Bare ground

Mulched

Mulches

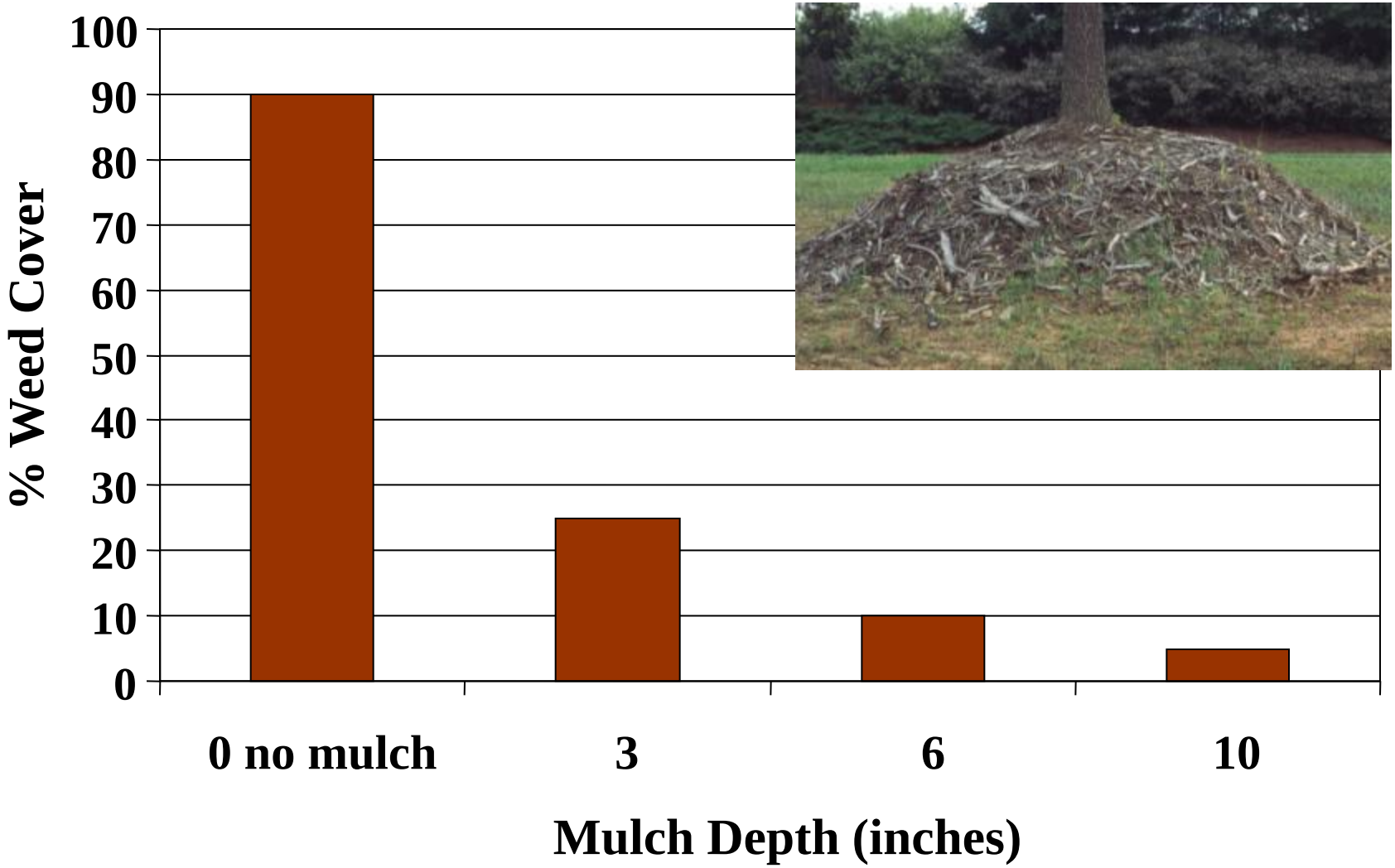
- Control many annual weeds from seed
- Do not control perennial weeds from roots, tubers or rhizomes
- Must be replenished yearly

Pigweed: an annual weed controlled by mulches

Horsenettle: a perennial weed not controlled by mulches

Kinds of mulches

How much mulch is enough?



Source: Greenley and Rakow, 1991

Mulches -- How Much?

In annual color beds:

- Organic mulches: ~ 1 in. Just enough to cover the surface. Bedding plants should provide the cover.
- Inorganic mulches: Do not use
- With a geotextile: Do not use

How Much Mulch Do You Need?

- Bark mulch: 1 cu yd covers ~ 100 sq ft to a depth of 3 inches

- Pine Straw: 1 bale covers about 35 sq ft.

When to mulch?

- Typically done in late winter
  - Before summer annuals germinate
  - Cover up winter weeds
  - Before ornamental plants leaf-out

Mulches do not control creeping perennial weeds

- Vegetatively propagated perennial weeds can emerge through mulches

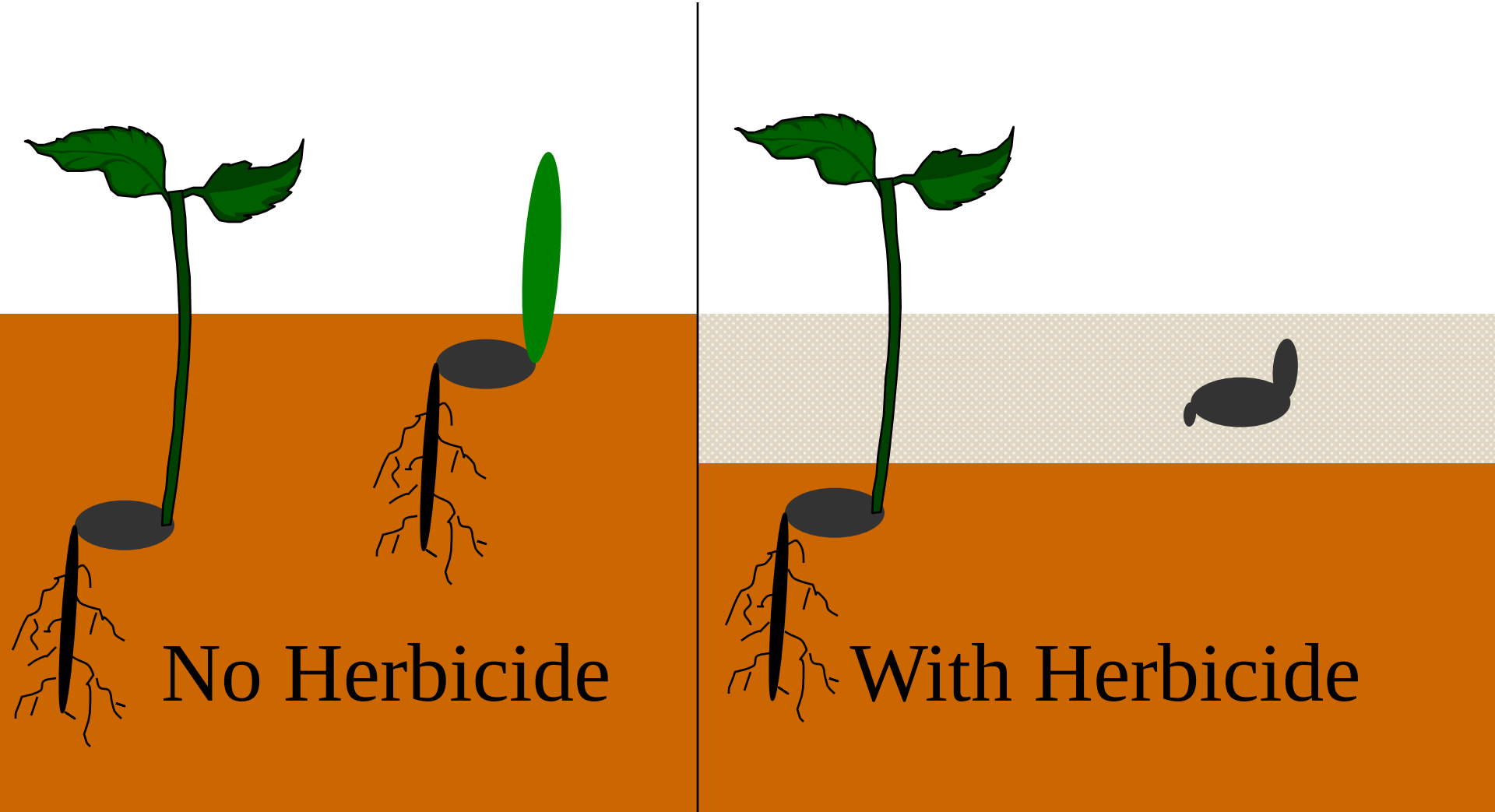
Nutsedge

Bermudagrass

Mugwort

Some Weeds Like Growing in Mulches

PRE Herbicides in Landscapes
Positional Selectivity



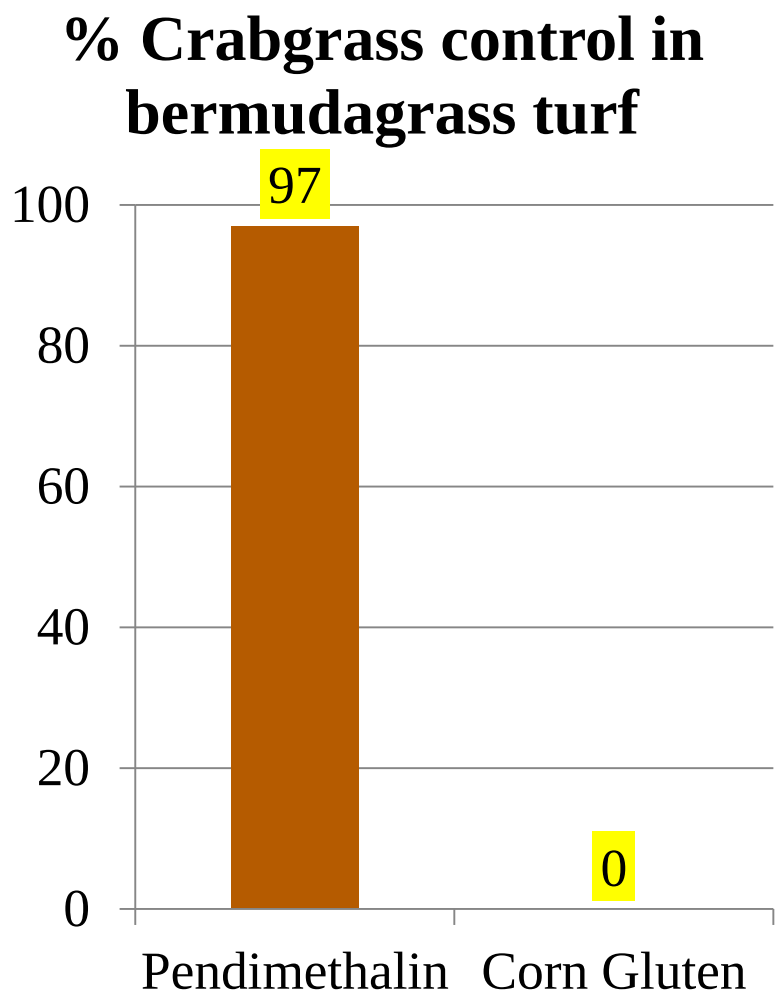
Corn Gluten – a "natural" preemergence herbicide

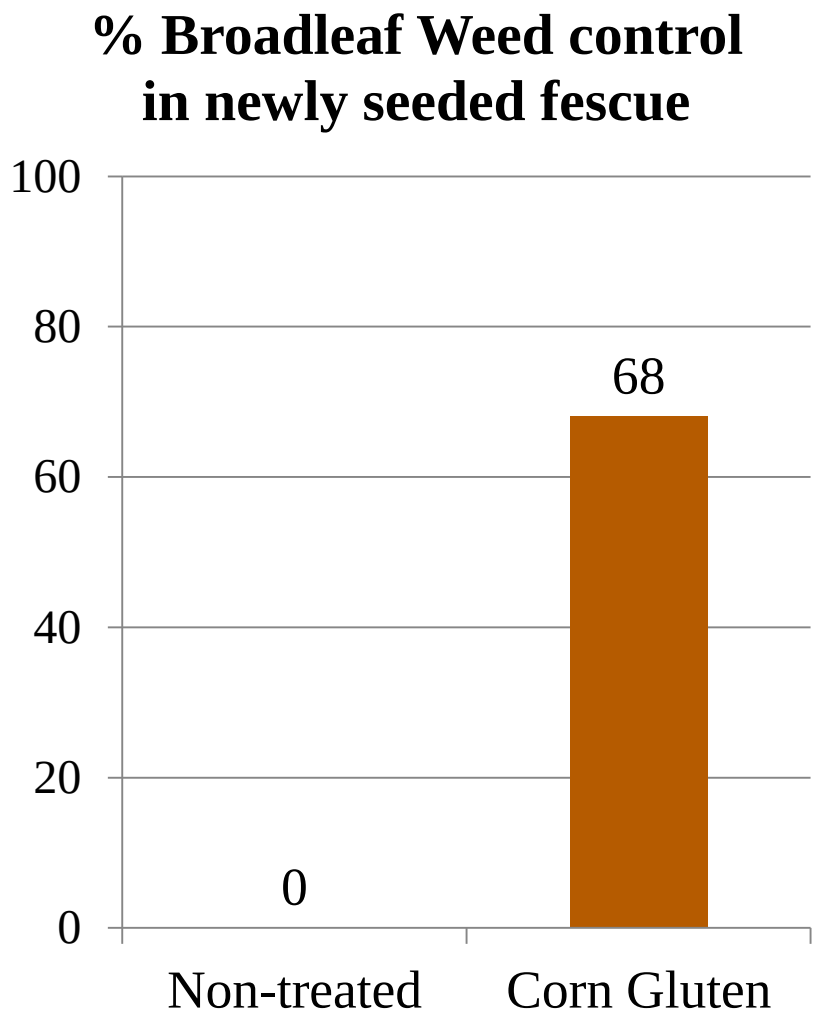
- Protein fraction of corn meal
- 60% Protein, 10% nitrogen by weight.
- Used as animal feed
- A tri-peptide (small bit of protein) acts like a preemergence herbicide
- Expensive
  - \$35 - \$50 / 1000 ft^2 = > \$400 for a 6000 ft^2 lawn

Corn Gluten

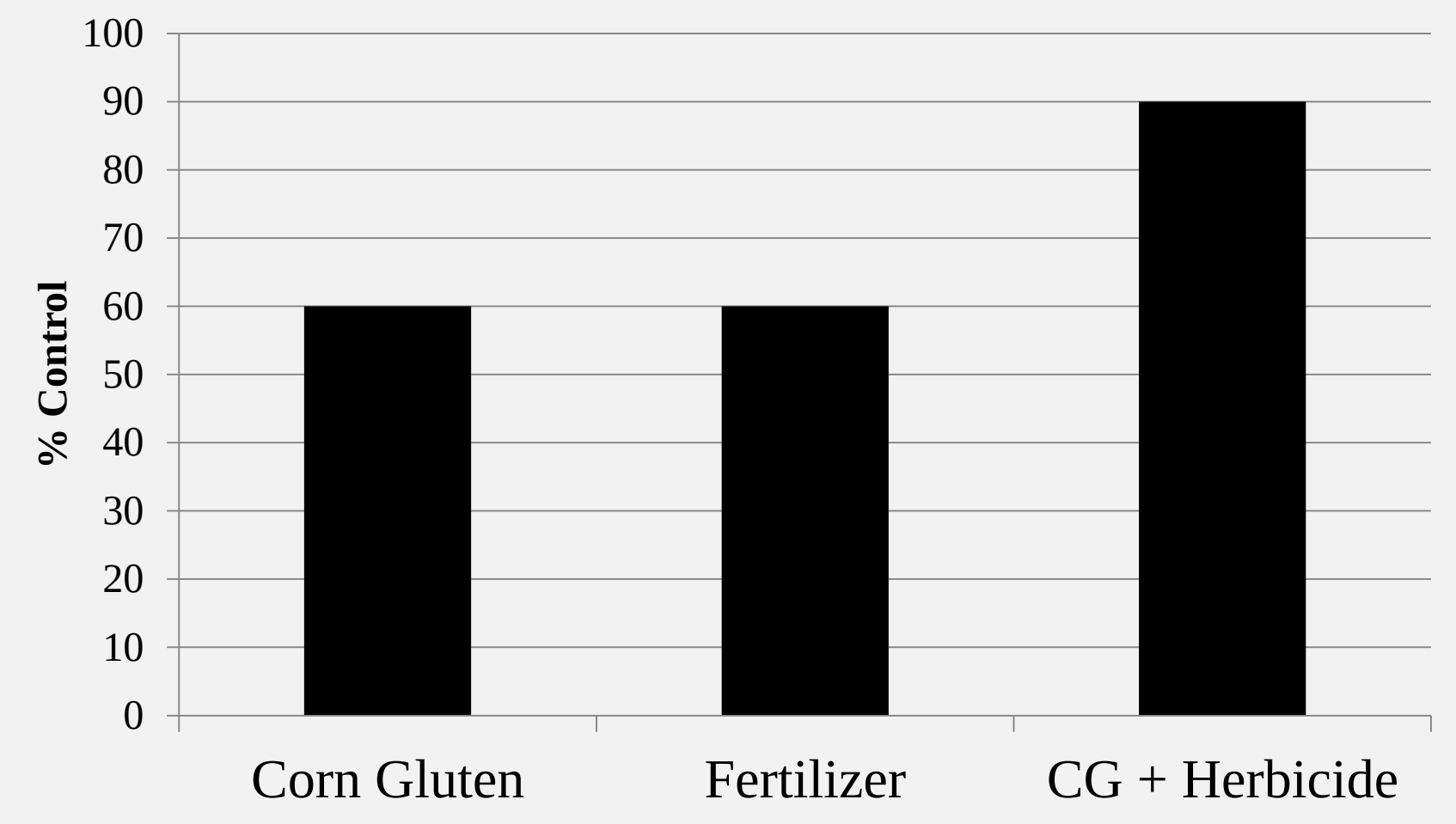
- 20 lbs per 1000 sq ft; before crabgrass emerges and again 4 to 6 weeks later
- = 4 lb N per 1000 sq ft
- This fertilizes the turf and suppressed crabgrass
- Works best in cool-season turf

‘Natural’ PRE weed control?





Percent Crabgrass control in turf following two years of treatment



Source: Cornell University; Senesac and Rossi 1997

Conclusions from this

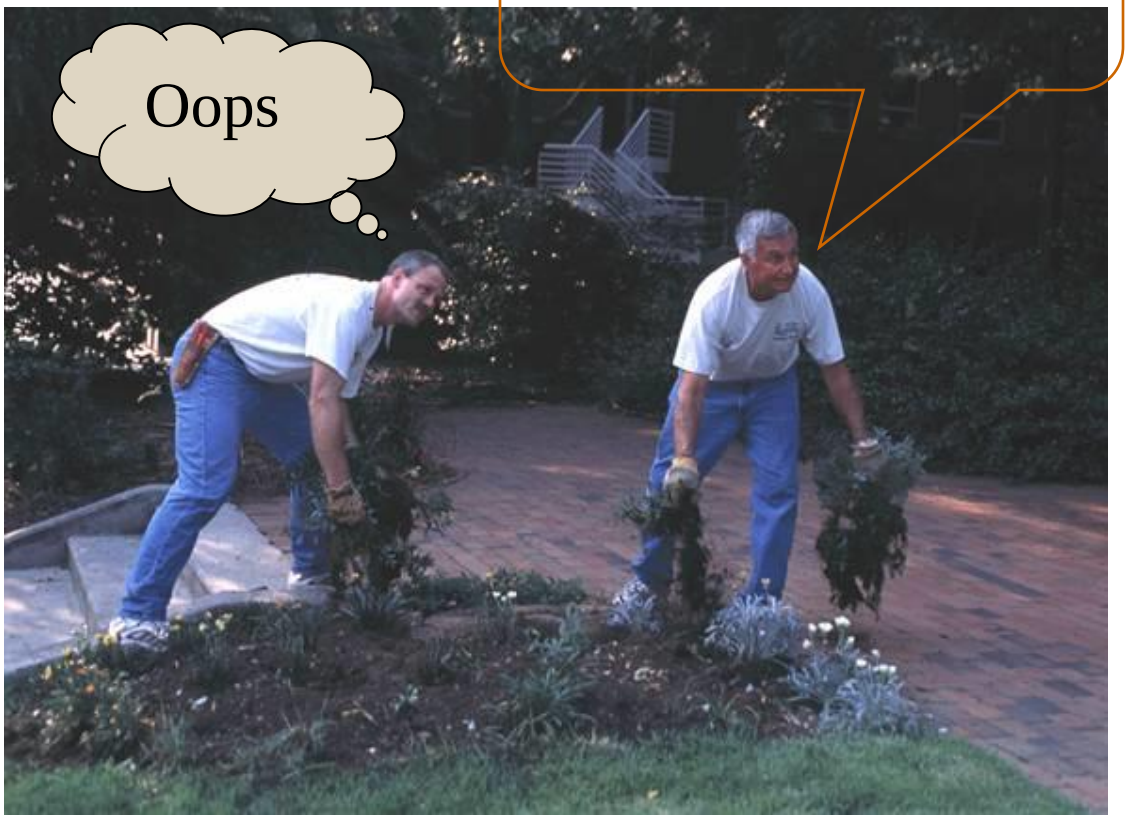
- Corn Gluten is herbicidal, but short-lived
- In lawns the weed control effects are largely due to enhanced turfgrass density through high levels of fertility
- In landscape beds and other bare soil situations, weed control is short-lived
- I have seen as much as 50% reduction in weeds and as little as 0.

Other PRE options?

- Research is continuing……

Postemergence Weed Control "Tools"

- Labor



Hand Weeding and Hoeing

- Seedling and tap-rooted weeds controlled
- Not effective for established perennial weeds

Successful hand weeding strategies

- Consider just how “clean” this landscape needs to be.
- To maintain a “clean” landsdape:
  - Weed Often!
  - Weed to prevent plants from going to seed
  - Don’t allow perennial weeds to establish
  - Manage weeds in the lawn as best you can

Weed before they go to seed

Months

Weeks / days

Organic Herbicides??

Avenger

Tests have proven that this formula made from citrus oil outperforms all other ...

$9.95 ~~$12.95~~

BurnOut

A broad spectrum natural spray that kills unwanted vegetation in eight hours.

$9.95

Crabgrass Killer

Naturally safe for people, pets and the environment. Crabgrass Killer is effective ...

$19.95 ~~$24.50~~

EcoSMART Weed & Grass

Works fast (see results in hours) without any synthetic toxins or chemicals.

$7.50

Fast Acting Weed Killer

Kills within hours and will not move through soil to injure nearby plants.

$6.95 ~~$9.95~~

Garden Kneeler

No more stooping, bending, or sore knees! The Yard Butler Garden Kneeler converts ...

$30.50 ~~$39.95~~

Garden Weeder

Uses a beveled edge to cut roots and tapered tines to remove unwanted vegetation.

$10.95 ~~$15.95~~

Herbicidal Soap

A fast-acting, non-selective formula that can be used within vegetable and flower ...

$7.50 ~~$9.50~~

Hula Hoe

Introduced in 1961, The Original Hula Ho forever changed the way gardeners ...

$21.50 ~~$24.95~~

Postemergence “biorational” herbicides

- Fatty acid herbicides
  - Scythe, herbicidal soaps,
- Natural oils
  - clove oil, Citrus oils, lemongrass oil, etc etc.
  - Usually mixed with vinegar
- Vinegar / acetic acid – WeedPharm and others

Scythe and other fatty acid soaps

- Contact burn
- Fast – within 30 min on a sunny day

Vinegar / Acetic acid herbicides

- Contact action
- High concentrations (>10% acetic acid) work best
- Controls young seedlings
- Thorough coverage is needed
- Repeat applications will be neede
- Burns foliage of perennial weeds

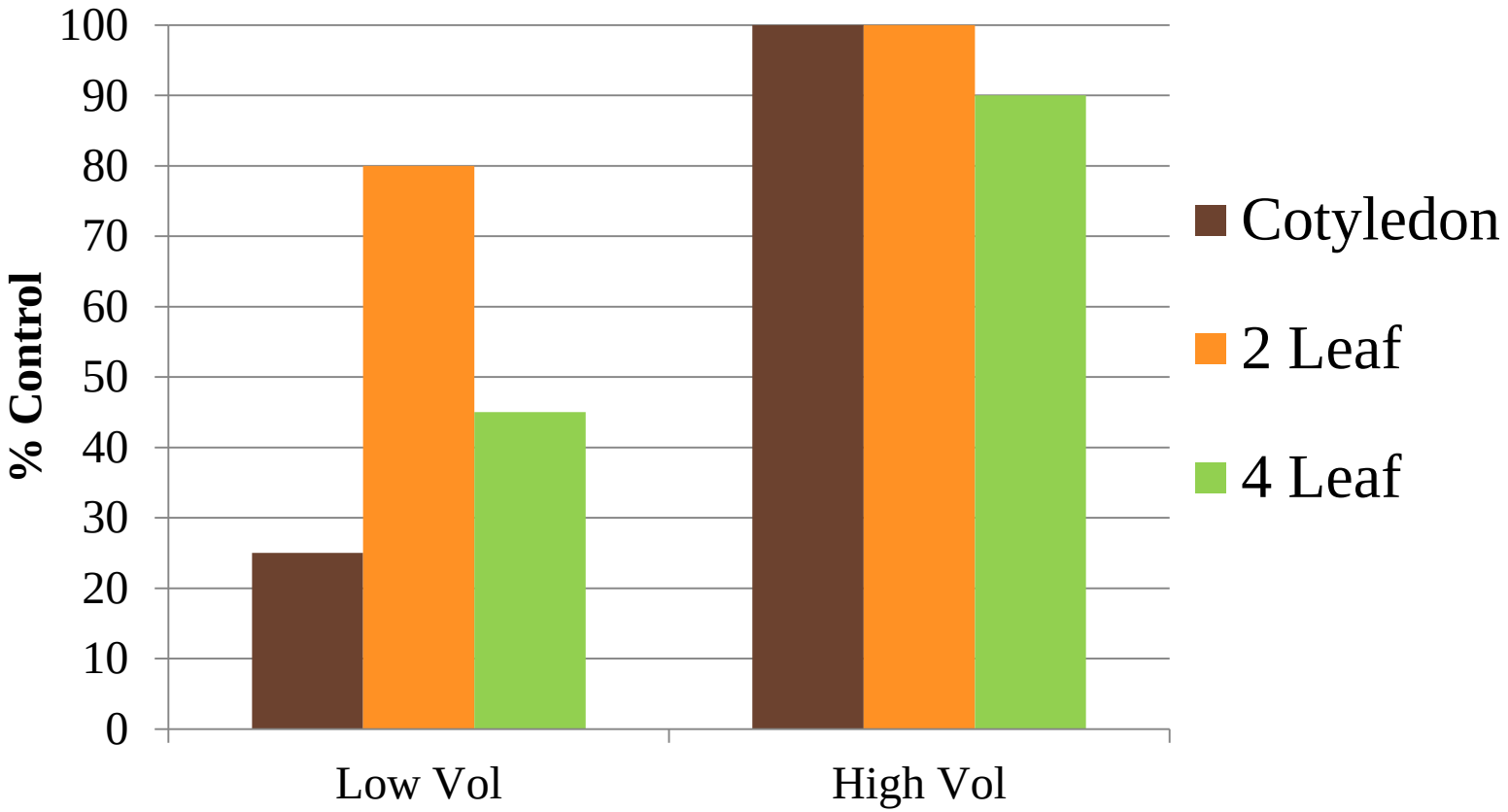
And just for fun:
http://www.pharmsolutions.com/weed_pharm.html

More information about acetic acid for weed control

- USDA research demonstrated that 10, 15, and 20% provided 80-100% control of seedling annual weeds
- http://oregonstate.edu/dept/nursery-weeds/weedspeciespage/acetic_acid_factsheet.pdf

Household vinegar is
~ 5% acetic acid

Pigweed control with 15% acetic acid vinegar applied at 34 and 68 GPA



Source: Belinder et al. Cornell University

What do they all have in common?

- Non-selective – damages most any green tissues
- Contact, Fast acting
- $$$

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….

Just because its natural, doesn’t mean its safe to handle

- Which product carried that statement?

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

- Which product carried that statement?

- Weed Pharm acetic acid
- Other natural weed killers carry similar caution statements

Natural Products

- Lots of products
- Non-selective
- Contact action
- No soil residual
- NOT safe for the handler!!! Avoid contact with skin, eyes; avoid inhaling spray mist

Selective “natural” products?

- Fe-HEDTA (Fiesta): an iron chelate that is phytotoxic – mostly to dicots

7 days after treatment

FE-HEDTA – Fiesta, Natria, etc

- Selective control of broadleaf weeds
- Primarily for the turf market
- Contact action
- Foliar contact will injure most ornamentals

Guidelines for Fiesta and other biorational “herbicides”

- Contact action
  - Spray coverage is important
  - Controls seedling annual weeds
  - Repeat applications will be required to kill weeds
  - Less effective on grasses
  - Will not control perennials but will “burn them back”

Other Alternatives?

- Flame weeders – almost as effective as contact herbicides

Hot Foam & Steam

- Contact kill
- 3+ x cost of herbicide
- Equipment costs high ($40,000)

Waipuna Hot Foam Weed Control