

Weeds
WEEDS
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Smart Gardening Conference
February 25, 2012

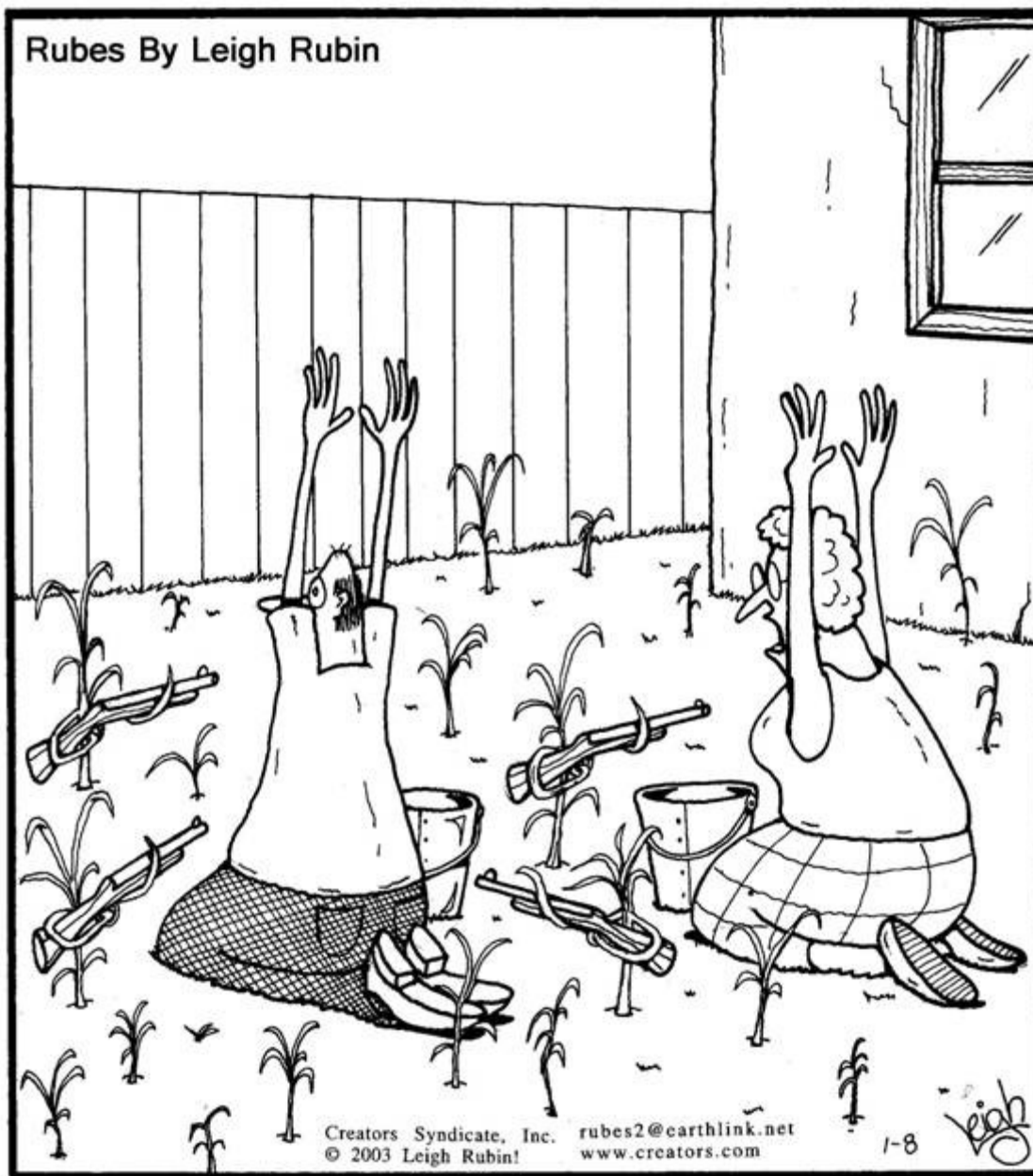
Kurt Hembree

Farm Advisor, UCCE, Fresno County

<http://cefresno.ucdavis.edu>



Rubes By Leigh Rubin



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Leigh Rubin

"We never should have waited this long ...
Now the weeds have *completely*
taken over."

Today's goal: get to know weeds better so we can manage them over the long-haul

1. Weed biology and ecology

- What's a weed
- Weed impacts
- Weed propagation and survival
- Weed ID

II. Principles to weed by

- Rationalizing your approach

III. Management strategies

- Non-chemical control
- Chemical control

I.

Weed Biology and Ecology

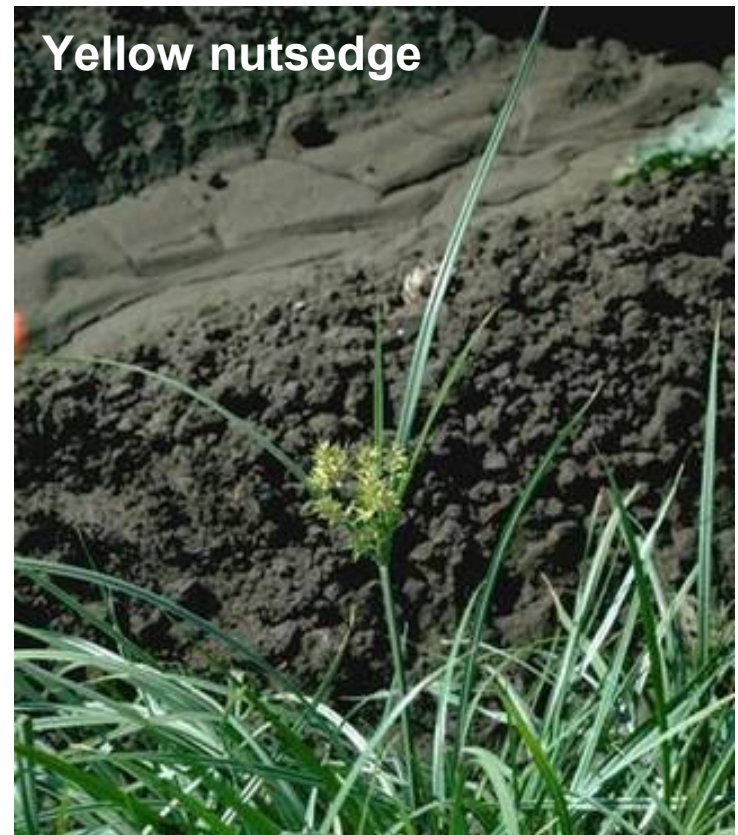
So, what makes any plant a weed?

- “a plant growing where it’s not wanted”
- “a plant that causes economic damage”
- “a plant growing out of place”
- “any plant that is objectionable or interferes with the activities or welfare of people”

Spotted spurge

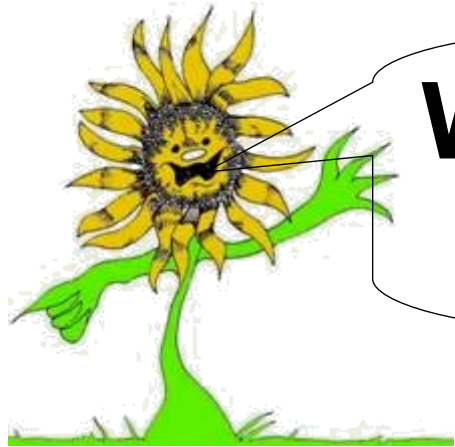


Yellow nutsedge



Wild blackberry





What have you done for me lately?

- The origins of many weeds are due to human activities.
 - ornamentals
 - forage and grazing plants
 - condiments or kitchen herbs



- Our activities and disturbances have created habitats that are favorable for the proliferation of weeds.

What impacts do weeds have on our urban landscapes?

Weeds are opportunistic; if given the chance will compete for water, nutrients, light, and space.



Weeds can increase costs to local governments for beautification.



A photograph of a concrete sidewalk with weeds growing in the expansion joints. The sidewalk is composed of several rectangular concrete slabs separated by dark expansion joints. Green weeds are growing in several of these joints, particularly along the central vertical joint and the horizontal joints. The weeds appear to be a common grass-like species. The concrete is a light gray color and shows some signs of wear and discoloration.

Weeds can be just plain ugly to look at.

In some cases, weeds can threaten life and property.



Weeds can impact human and animal health.



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Weeds make a good habitat for rodents, pathogens, and insects.



How do weeds propagate?

(or better yet – how do weeds survive?)

- Vegetative propagation
- Massive seed production

Vegetative propagation: (perennial weeds)

- Rhizomes – horizontal underground stems



Johnsongrass

Vegetative propagation:

- Stolons – horizontal aboveground stems



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Bermudagrass

Vegetative propagation:

- Tubers or Nutlets – swollen end of root or rhizome with compacted nodes and internodes



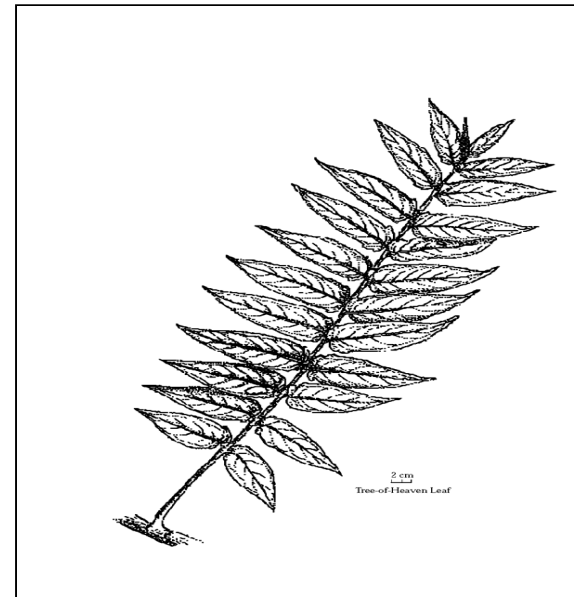
Vegetative propagation:

- Bulbs – leaf bud with fleshy scales usually belowground



Vegetative propagation:

- Roots – axillary buds on the roots



Seed production:

(“One year’s seeding makes seven years’ weeding”)










Aspects of seed production:

- Annuals and biennials by seed only
- Perennials by seed or vegetative propagation
- A characteristic of weeds for high reproductive capacity

Seed characteristics that aid weed survival:

- Production – it’s a numbers game
- Survival – lying dormant in the soil
- Dispersal – how they spread
- Seed bank – like a checking or savings account

Seed - *numbers*

Common name of weed	# of seeds/plant
Barnyardgrass 	7,160
Horseweed 	>500,000 
Broadleaf plantain 	36,150
Common lambsquarters	72,450
Common mullein 	223,200
Wild oat 	250
Dandelion 	15,000
Redroot pigweed 	117,400
Purslane	52,300
Tumble mustard	129,000
Yellow nutsedge 	2,240

Seed - *dispersal*

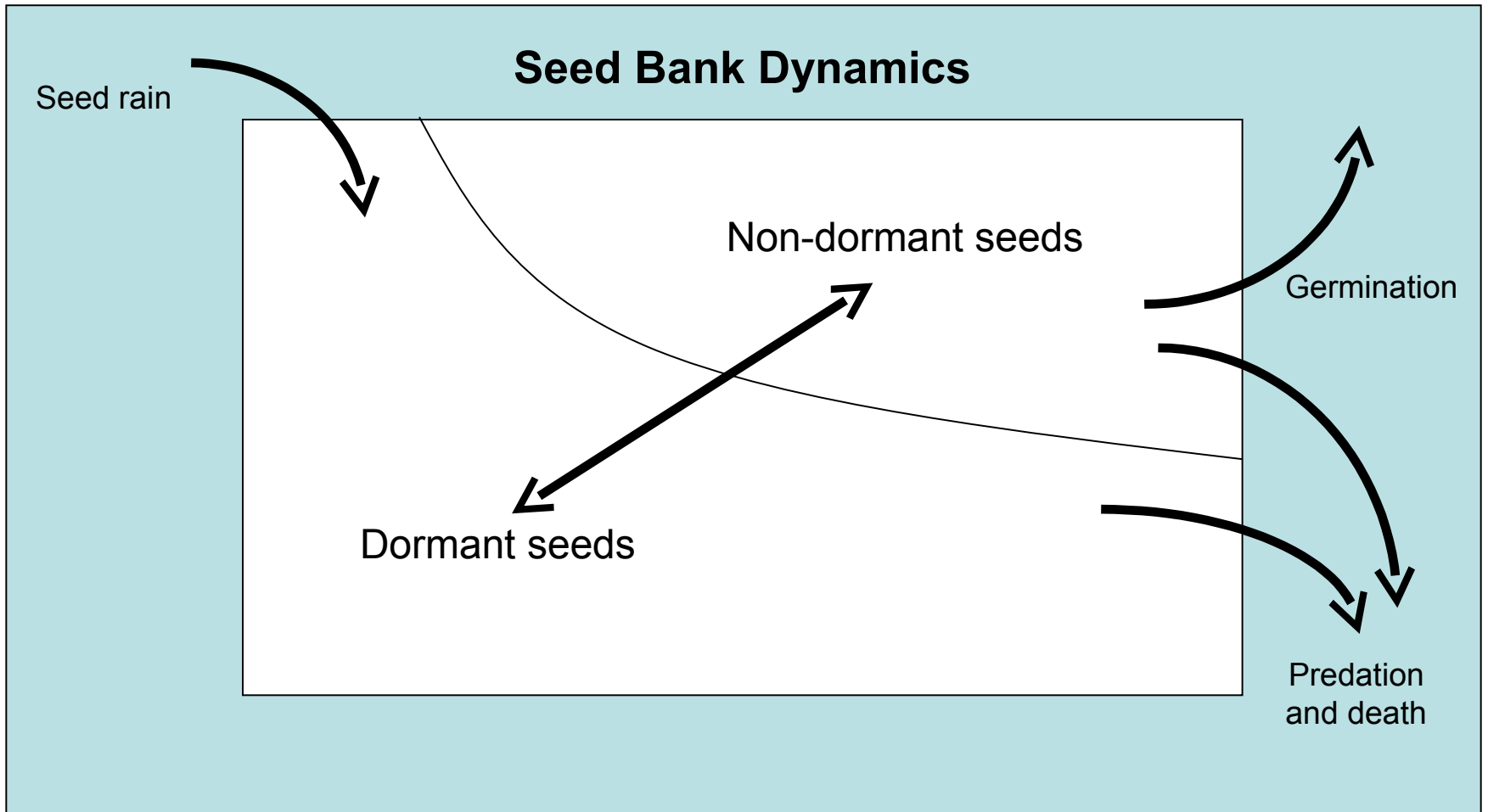
- Wind
- Water
- Birds, animals, insects
- Man (self, equipment, etc.)



Seed - *survival*

Common name	Years alive in soil
Horseweed	<2
Barnyardgrass	5
Puncturevine	15-20
Shepherd's-purse	15-35
Common purslane	20-25
Velvetleaf	15-40
Eastern black nightshade	40+
Mullein	100+

Seed – *seed bank*



Why is it important that we be able to identify specific weeds?

- so we can select tools or options that will work
- so we know when and how to attack them
- so we can have realistic expectations
- so we can impress the neighbors

How are weeds identified?

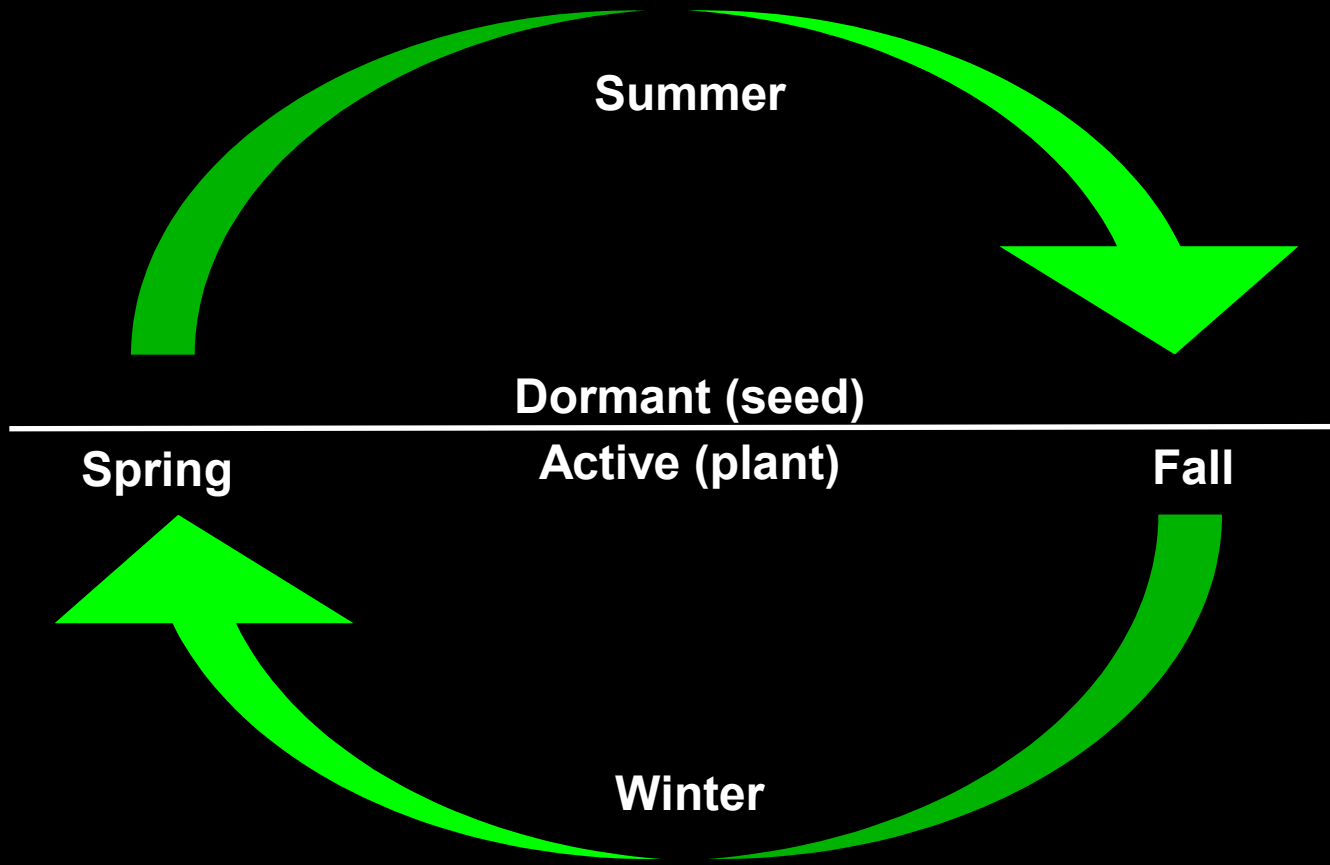
1. Botanical classification (most reliable)
2. Life-cycle (start to finish)
3. Morphological characteristics (structural differences)
4. Venue or location (plant community they're in)
5. Habitat (dry, moist, wet, etc.)
6. Regulatory (noxious, poisonous, or just common)
7. Physiological characteristics (how they fix CO₂)
8. Day-length (when they flower)

Life-cycle of weeds

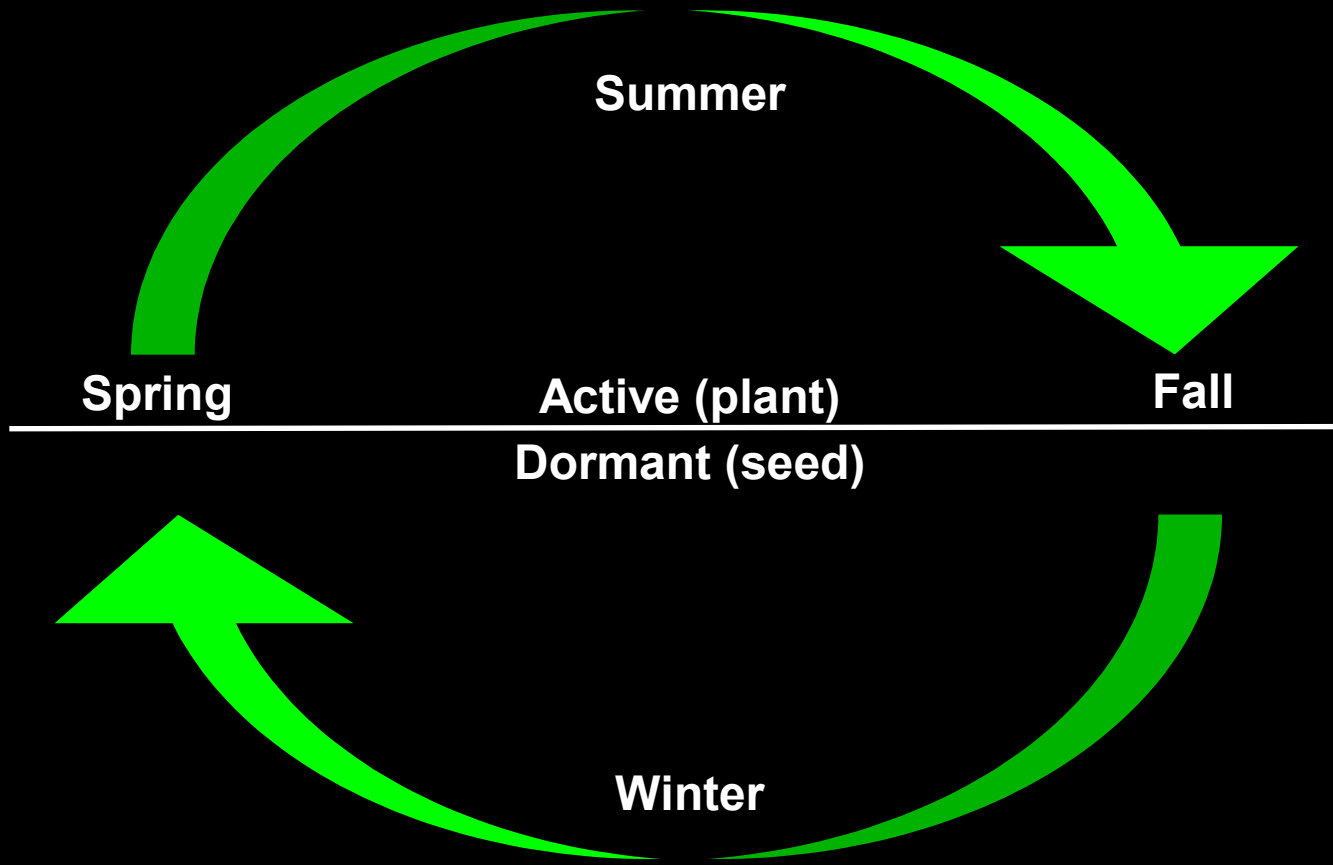
(from start to finish)

- **Annual**: completes its life cycle in 1 year or less
 - summer annuals
 - winter annuals
- **Biennial**: completes its life cycle in <2 years
- **Perennial**: lives for 2 or more years

Life-cycle of winter annuals

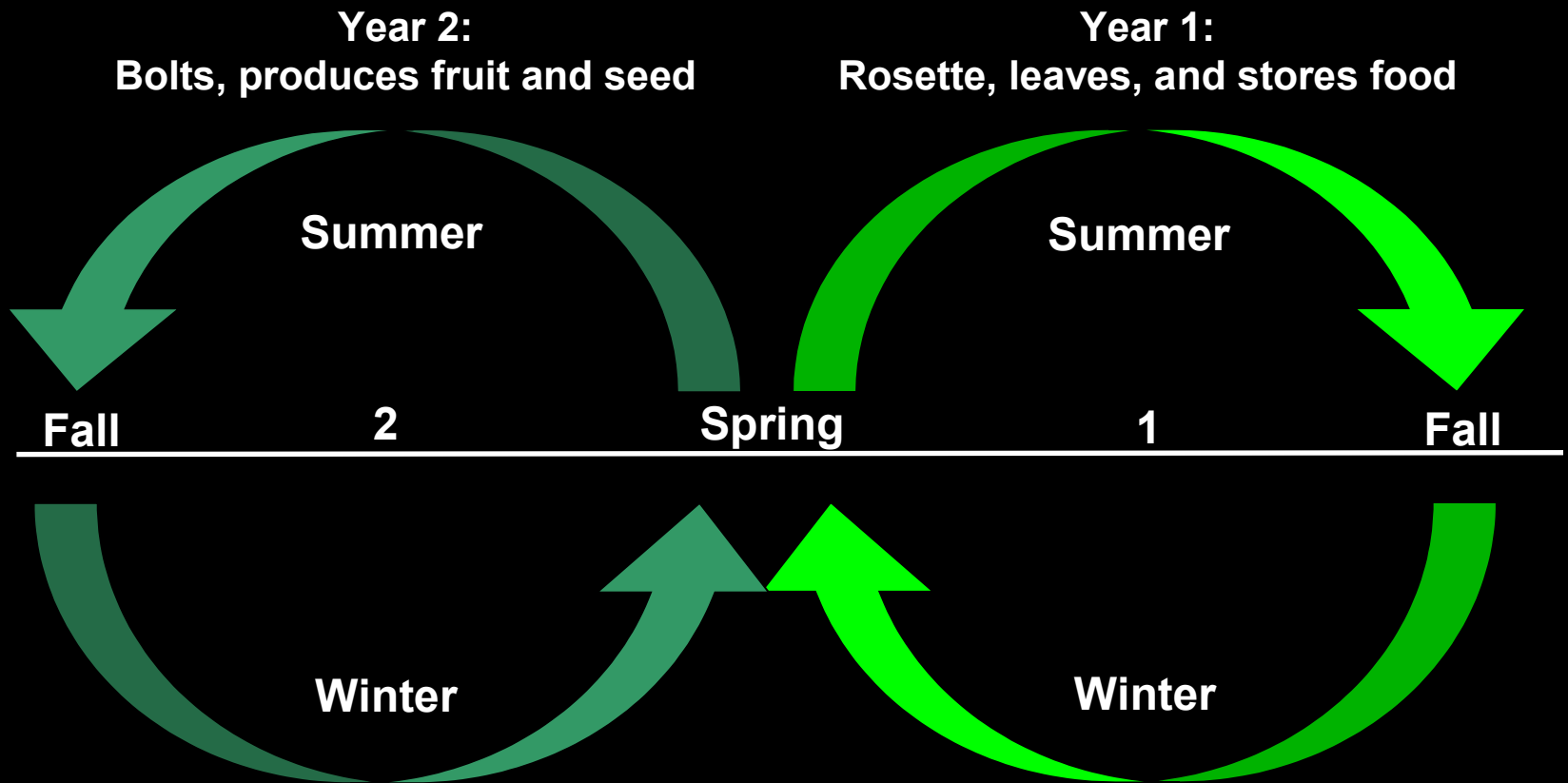


Life-cycle of summer annuals

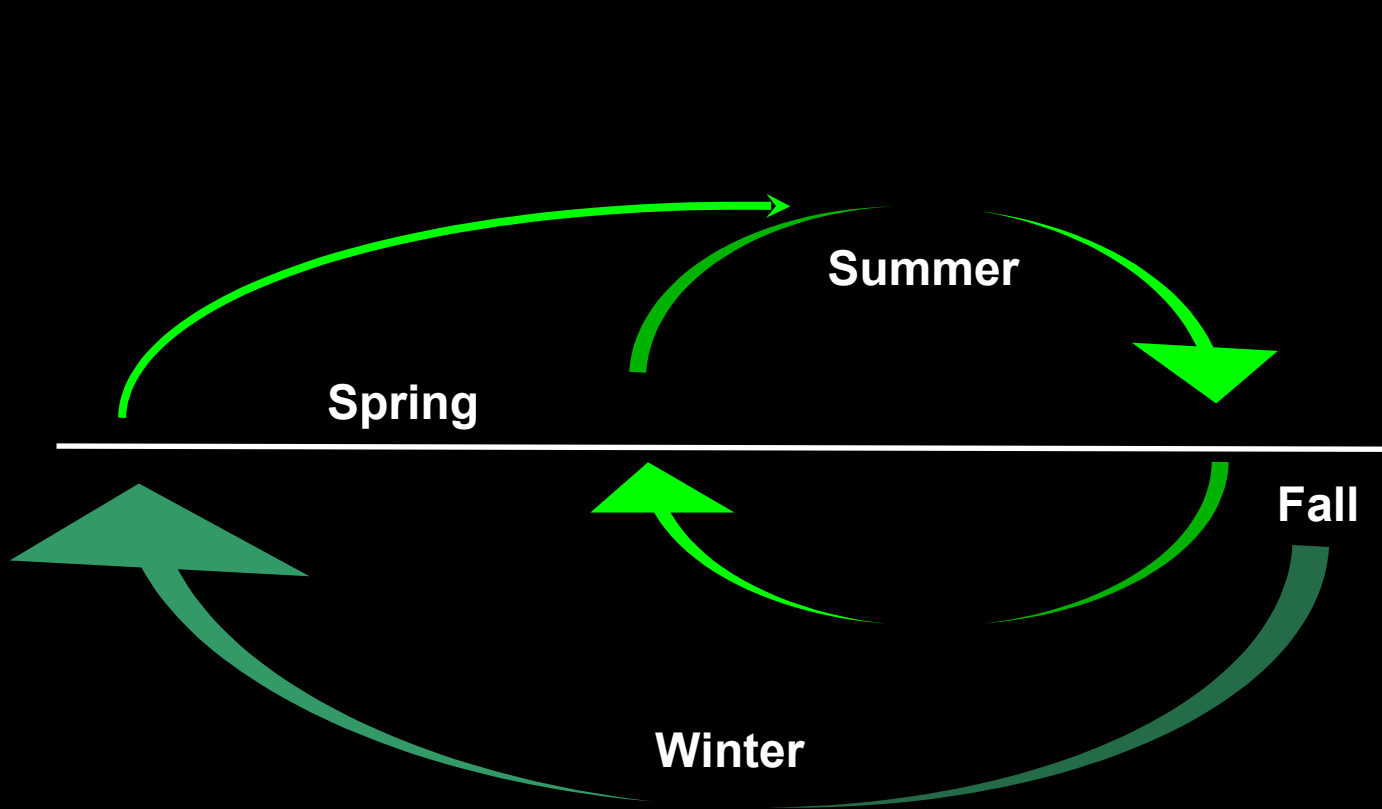


Life-cycle of biennials

(e.g. sweet clover, wild carrot, bristly oxtongue)



Life-cycle of perennials



Morphological characteristics

(structural differences to tell them apart)

- **Broadleaves (dicots)**



- leaves broad with netted veins
- pair of seed leaves at emergence

- **Grasses (monocots)**



- leaves narrow with parallel veins
- stems round to flattened
- single narrow leaf at emergence

- **Sedges (monocots)**



- leaves narrow with parallel veins
- leaves in sets of 3's
- stems triangular in cross section

How many of the weeds on the tables outside could you identify?

1. Henbit (WA)
2. Catsear (P)
3. Burclover (WA/SA)
4. Cudweed (WA)
5. Horseweed (SA/B)
6. Redmaids (WA)
7. Cheeseweed (WA)
8. Chickweed (WA)
9. Swinecress (WA)
10. Shepherd's-purse (WA)
11. Cutleaf eveningprimrose (SA)
12. Annual bluegrass (WA)
13. Hare barley (WA)
14. Redstem filaree (WA)
15. Knotweed (SA)
16. Fiddleneck (WA)
17. Groundsel (WA)
18. Yellow starthistle (WA/B)
19. Bermudagrass (P)
20. Dichondra (P)

II.

Principles to Weed By

1. Use an organized, well thought-out approach:

- What are your objectives (is it just spray and pray)
- Knowledge of the weeds and methods to manage them
- Realistic approach to limitations and technologies available

2. Be realistic in your expectations:

- A single option doesn't work for all weeds or situations
- Once a weed is established, it will usually be a problem
- More than one method may need to be used
- Is it a short-term or long-term fix

3. Consider the venue:

- Many options may be available for any given weed problem, but may vary between particular locations (turf, garden, fence line, a few fruit trees, etc.).

4. Be a problem-solver:

- Diagnosis
- Select the “best” option(s) available
- Attack the problem
- Follow-up evaluation and efforts

III.

Management Strategies

Weed management is based on two concepts:

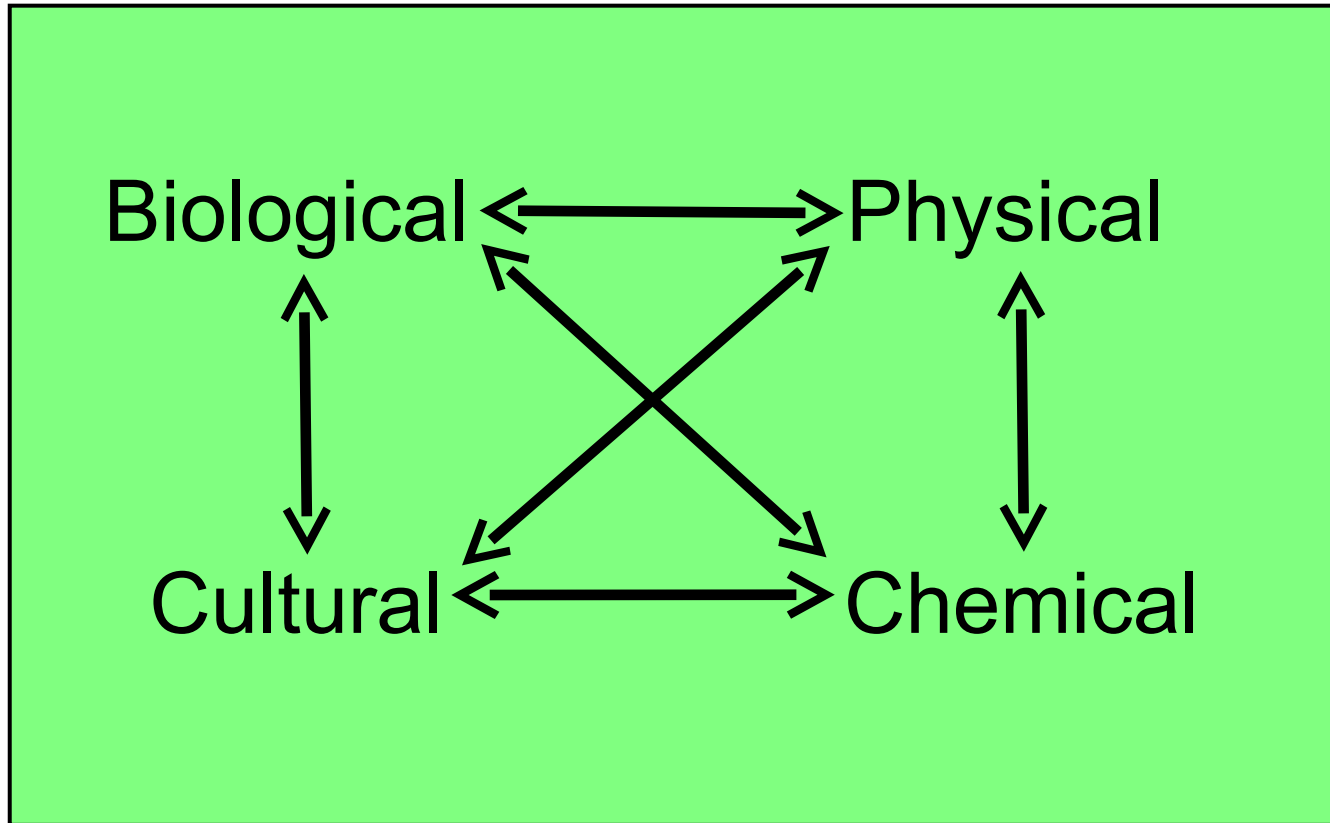
1. Prevention: limiting introduction of weeds

- Treat before weeds produce seed (treat small weeds!)
- Keep property lines clean (good neighbor policy)
- Clean off boots, shoes, and gloves
- Use good composted materials (free of weed seeds)

2. Management: steps taken to reduce the infestation

- Biological
- Cultural
- Mechanical or physical
- Chemical

Weed management options



Biological control

(releasing living organisms to reduce weed density)

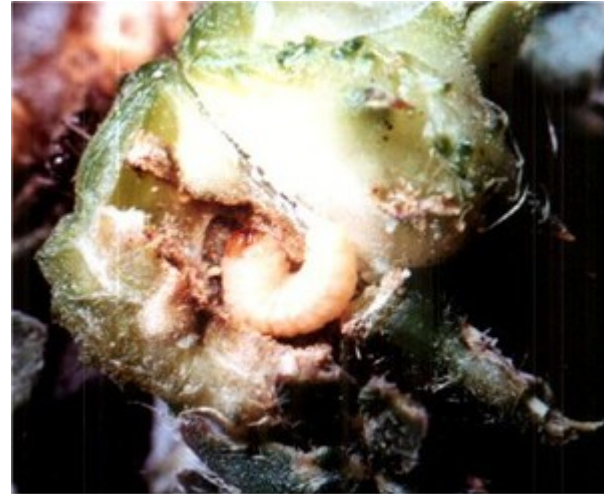
Why do insects make good bio-control agents?

- Present in great variety and often specific to certain plants
- Will adapt to the weed host's life-cycle
- Various stages of insect can feed on different weed parts

Puncturevine weevils



Stem weevil
Microlarinus lypriformis



Seed weevil
Microlarinus Lareynii



This will work if you know what to do!



Find them
Bag them
Release them

I'll work for food!



Cultural control

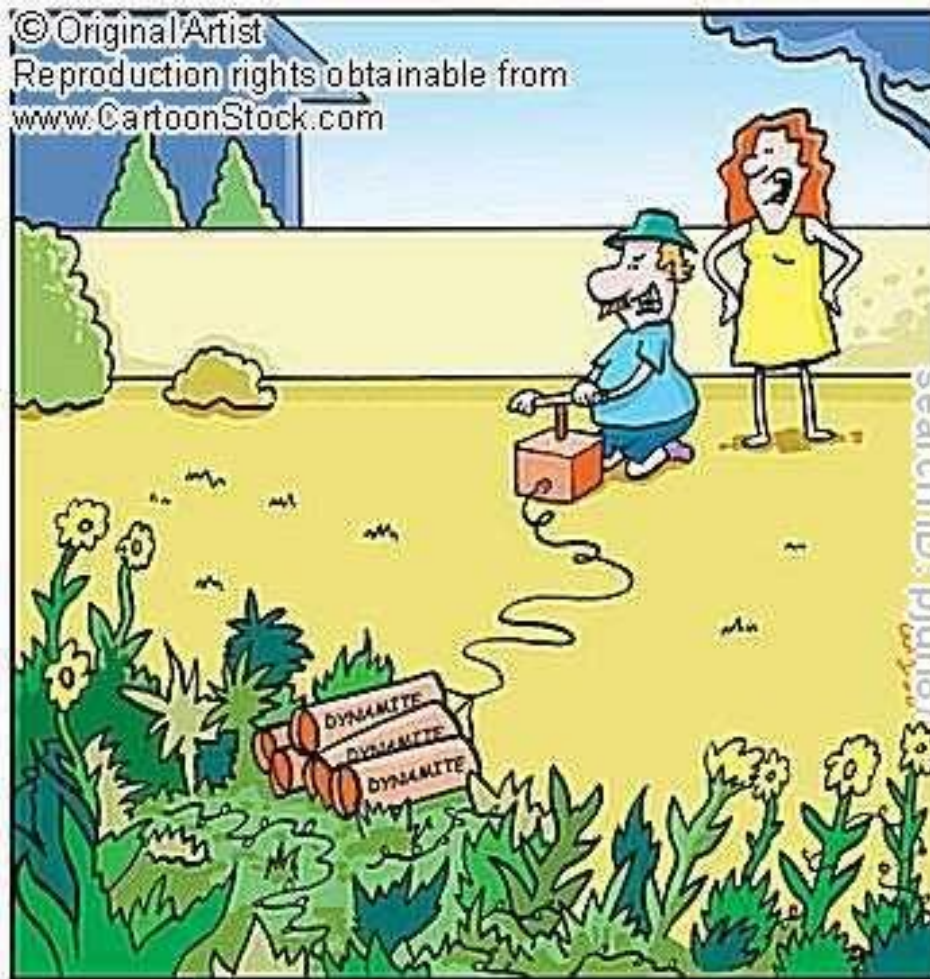
(favoring desired plants over weeds)

What are some practical options?

- Don't over-water or over-fertilize, because weeds like it.
- Bury drip tape 8-10" deep to keep summer weeds out of ornamentals (keep the top 2" dry).
- Pre-irrigate, then kill weeds before planting vegetables.
- Over-seed blank areas in turf (crabgrass will infest an open area the size of a dime).
- Use a dense plant spacing on shrubs to shade out weeds.

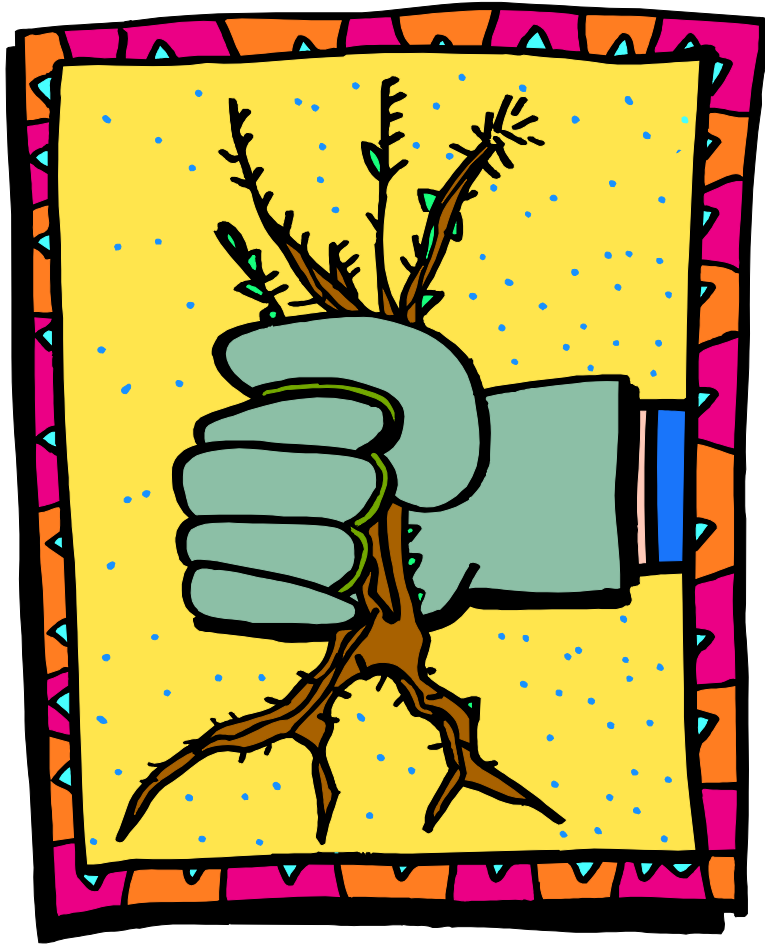
Mechanical or physical control

(to eliminate weeds by direct contact)



"That's your idea of weed control?"

Get to the root of the problem!



I CAN NEVER
TELL THE PLANTS
FROM THE WEEDS!

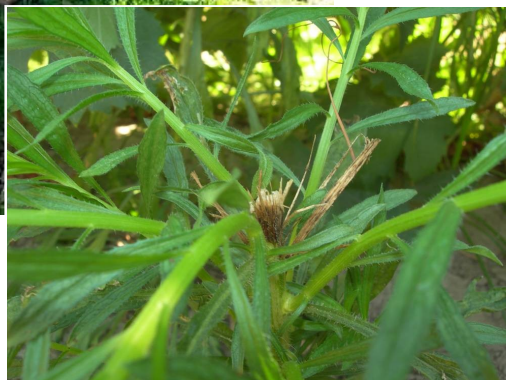
PULL THEM ALL UP AND
THE ONES THAT GROW
AGAIN ARE THE WEEDS!



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Mow or trim annual broadleaf weeds.



Till soil to destroy small annual weeds and bury weed seed.

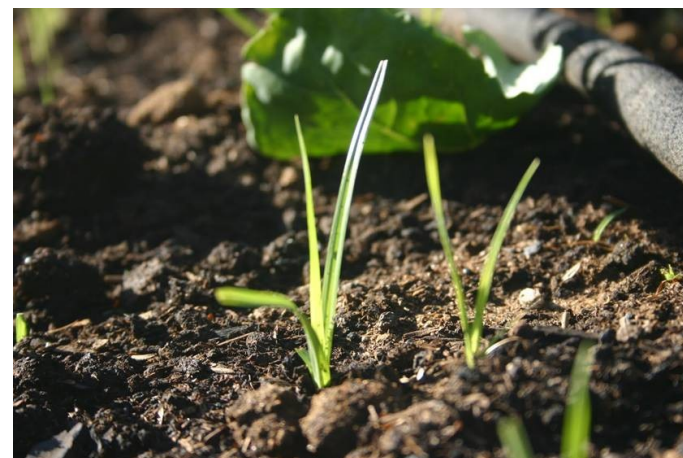


Lay a 4 to 6” organic mulch layer to help shade out weeds in flower beds.



Replenish mulch as it breaks down.

Fabric mulches can be used to keep the sunlight from reaching weed seeds and make hand weeding easier.



Nutsedge emergence





Black plastic mulch can be used in vegetable gardens, but some handweeding will likely be needed.



- 1. Prepare the soil in summer.** Pull any weeds or old crops. Turn in any soil amendments, then rake the surface smooth. Remove stones or clumps that might raise the plastic and create air pockets that could cause uneven heating.
- 2. Water thoroughly.** Leave a sprinkler on for several hours or overnight to soak the soil. This creates 100% humidity under the plastic, which acts with the heat to kill weed seeds.
- 3. Dig a trench** all around the bed or area 6-8 inches deep..
- 4. Lay a clear plastic sheet** 3-6 mm thick, over the area, overlapping the trench on all sides. Fill in the trench with soil to weigh down the plastic while pulling it as tight as possible.
- 5. Sit back, relax, and wait.** It will take about four to six weeks of sunshine to pasteurize the soil and kill weed seeds, pathogens, and insects..

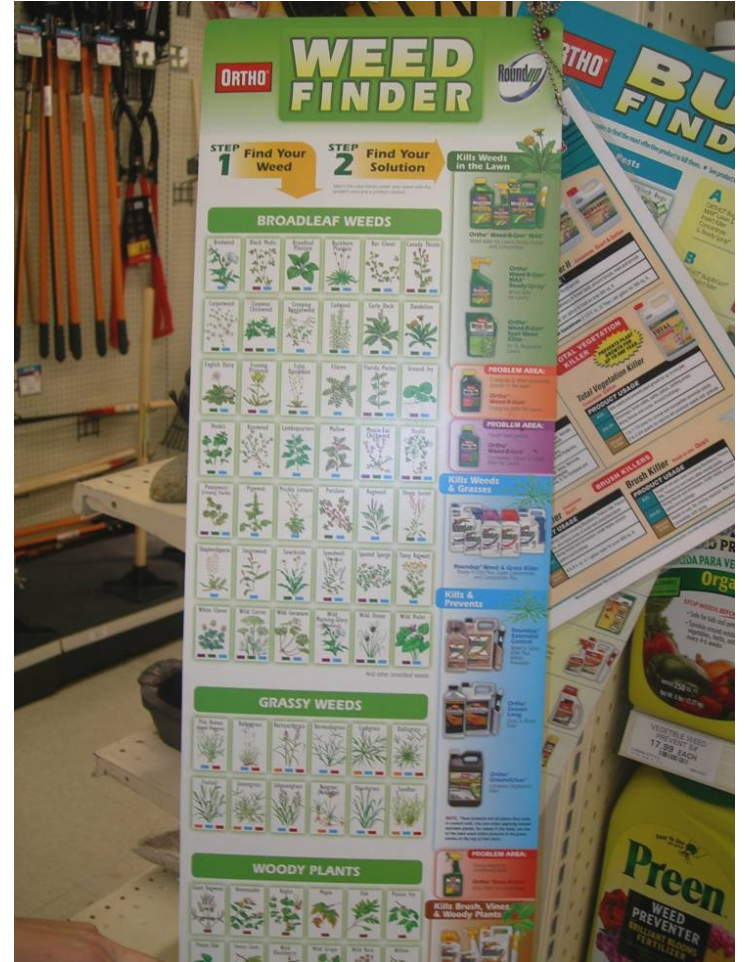
Chemical control

(with herbicides)

Herbicides are used to suppress, kill, or interrupt the growth of weeds. Successful control depends on the target plant(s), the herbicide, and the environment.



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Herbicides Available for Homeowners - January 2012
List prepared by Michelle Le Strange and UCCE Master Gardeners of Tulare & Kings Counties¹



Mfr	Product trade name	Form	Chemical	Active Ingredient (%)	Pre or Post
Spectracide	Brush Killer Spray	liquid - conc.	2,4-D ester+dichlorprop+dicamba	9.74+4.78+1.65	post
Monterey	Brush Buster	liquid	2,4-D+2,4-DP	16.05+16.10	post
Gordon's	All-Season Brush No More	liquid	2,4-D+2,4-DP+dicamba	9.74+4.78+1.65	post
Bayer Advanced	All in One Lawn Weed and Crabgrass Killer	liquid - RTS	2,4-D+dicamba+quinclorac	4.85+0.45+1.61	post
Gordon's	Trimec Crabgrass Plus Lawn Weed Killer	liquid - conc.	2,4-D+dicamba+quinclorac	6.42+0.60+2.13	post
Green Light	Wipe-Out Crabgrass Killer Plus	liquid - conc.	2,4-D+dicamba+quinclorac	7.3+0.84+3.5	post
Monterey	Crab-E-Rad Plus	liquid - RTU	2,4-D+dicamba+quinclorac	6.56+0.68+4.08	post
Ortho	Weed-B-Gon MAX + Crabgrass	liquid - conc.	2,4-D+dicamba+quinclorac	6.42+2.13+0.60	post
Scotts	Turf Builder with Plus 2 (28-3-3)	granular	2,4-D+MCP	1.21+0.61	post
Monsanto	Green Sweep Weed & Feed (20-0-0)	liquid	2,4-D+MCP+2,4-DP	2.29+2.30+2.26	post
Monterey	Weed Whacker	liquid	2,4-D+MCP+2,4-DP	4.55+4.58+4.53	post
Best	St. Augustine & Bermudagrass Weed & Feed (16-7-7)	granular	2,4-D+MCP+dicamba	0.641+0.184+0.078	post
Green Light	Wipe-Out Broadleaf Weed Killer 2	liquid	2,4-D+MCP+dicamba	1.9+3.33+0.81	post
Lilly Miller	Lawn Weed Killer	liquid - RTU	2,4-D+MCP+dicamba	0.593+ .143+0.066	post
Lilly Miller	Weed n Feed - Hose 'n Go	liquid	2,4-D+MCP+dicamba	5.673+1.370+0.629	post
Lilly Miller	Lawn Weed Killer	liquid - conc.	2,4-D+MCP+dicamba	9.41+2.27+0.04	post
Scotts	Lawn Pro Step 2 Plus Fertilizer (29-3-3)	granular	2,4-D+MCP+dicamba	1.25+0.62+0.05	post
Best	Weed & Feed for Grass Lawns (15-5-7)	granular	2,4-D+MCP+dicamba	0.55+0.24+0.052	post
Bayer Advanced	Southern Weed Killer for Lawns	liquid - conc.	2,4-D+MCP+dicamba	7.59+1.83+0.84	post
Gordon's	Trimec Lawn Weed Killer	liquid - conc.	2,4-D+MCP+dicamba	7.59+1.83+0.84	post
Ortho	Weed-B-Gon MAX for Southern Lawns	liquid - conc.	2,4-D+MCPA+dicamba+carfentrazone	4.0+0.49+0.27+0.16	post
Gordon's	Speed-Zone Lawn Weed Killer	liquid	2,4-D+MCP+dicamba+carfentrazone	28.57+5.88+1.71+0.62	post
Preen	Lawn Step Saver	granular	2,4-D+MCP+dicamba+dithiopyr	0.64+0.14+0.06+0.16	post
Ortho	Weed-B-Gon Max Plus Crabgrass Control	liquid - RTU	2,4-D+MCP+dicamba+quinclorac	0.12+0.22+0.05+0.10	post
Scotts	Liquid Turf Builder with Plus 2 (25-1-2)	liquid	2,4-D+MCP+dichlorprop	2.29+1.15+1.13	post
Spectracide	Weed Stop 2X Killer for Lawns	liquid	2,4-D+MCP+dicamba+sulfentrazone	7.57+2.73+0.71+0.18	post
Safer	Superfast Weed & Grass Killer	liquid	ammoniated soap of fatty acids	3.0	post
Monterey	Herbicide Soap	liquid	ammoniated soap of fatty acids	22.0	post
Pro-Gard	Oxalis X	liquid	ammonium thiosulfate	55.0	post
Ortho	Weed-B-Gon Spot Weed Killer for St. Augustine Lawns	liquid	atrazine	0.538	post
Green Light	Amaze Grass & Weed Preventer	granular	benfen+oryzalin	1.0+1.0	pre
Bandini	Pre-Sprout 2 (Stop Grass Weed Seeds)	granular	benfen+trifluralin	0.61+0.31	pre
Best	Spurge & Crabgrass Preventer (15-5-7)	granular	benfen+trifluralin	0.076+0.39	pre
Monterey	Nutgrass Nihilator (only works on yellow nutsedge)	liquid	bentazon	42.0	post
Monterey	Starbuck's Killer also sold as Kratos Killer	liquid - conc.	chlorpyrifos	40.0	post

Factors to consider before selecting herbicides:

1. **Venue**: The area the weeds are growing in.
2. **Efficacy**: How effective a particular herbicide is on a particular weed or group of weeds (100% control is almost never achieved). Read the label.
3. **Weed Stage**: The development stage of the weeds at the time of treatment (seeds vs. established plants).
4. **Time of Year**: When you expect certain weeds to be a problem.
5. **Environment**: Factors affecting herbicide performance (e.g. rainfall, windy, foggy, etc.)

Terms you need to know about herbicides:

1. Herbicide selectivity: degree of response among plants.

- “Selective” – more toxic to some plant species than others.
For example: 2,4-D or Fusilade.

- “Non-selective” - toxic to many plant species present if herbicide comes in contact with the plant.
For example: Roundup or Pendulum.

Terms you need to know about herbicides:

2. Herbicide movement: degree of movement within a plant.

- “Contact” – causes localized injury to plant tissue where contact occurs and does not move within the plant.
For example: Acetic acid, Safer Soap, and diquat.

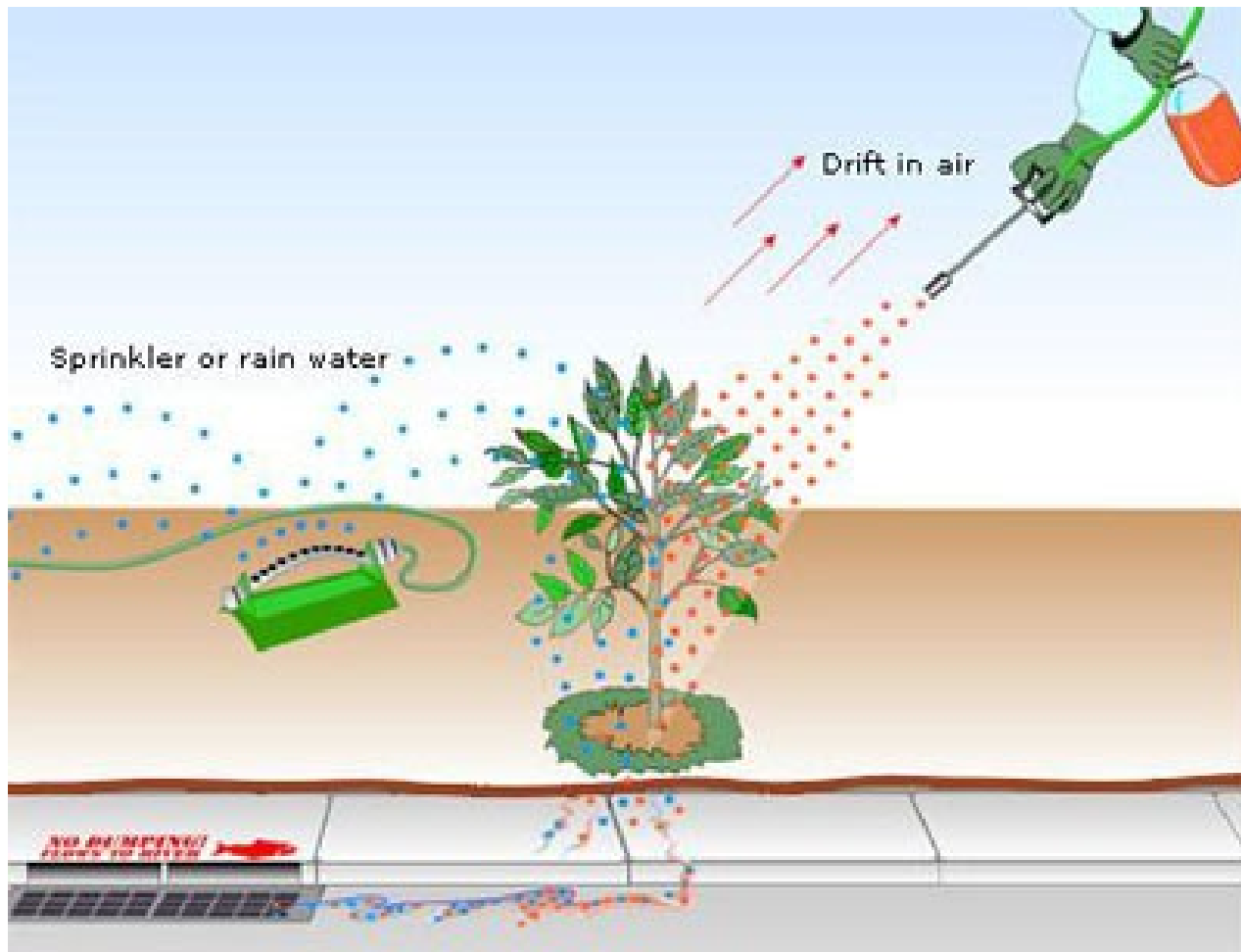
- “Translocated” - moves within the plant to a specific area or areas to kill the plant.
For example: Roundup or 2,4-D .

Terms you need to know about herbicides:

3. Herbicide placement: applied to the plants or the soil.

- “Foliar Applied” – must come in direct contact with leaves and stems for absorption to render a phytotoxic effect, and are often called “postemergents”.
For example: Sedgehammer or Banvel.
- “Soil Applied” - must come in contact with the soil and be absorbed by the roots and/or shoots of germinating weed seeds and/or emerging weeds to render a phytotoxic effect, and are often called “preemergents”.
For example: Pendulum or Weed Impede.

Regardless of which herbicide(s) you use, always read the label and apply them in a responsible manner.



Pre-treatment checklist:

1. The weeds have been correctly identified ✓
2. The products will control the weeds and are safe for the site ✓
3. I know if they need to be applied preemergent or postemergent ✓
4. The treatment will work for the time of year ✓
5. The conditions are favorable for treatment ✓
6. I know how much product and water are needed for the area ✓
7. I'm aware of other plants nearby that might be sensitive ✓
8. I'll apply the herbicides properly and as uniformly as possible ✓

SUMMARY

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