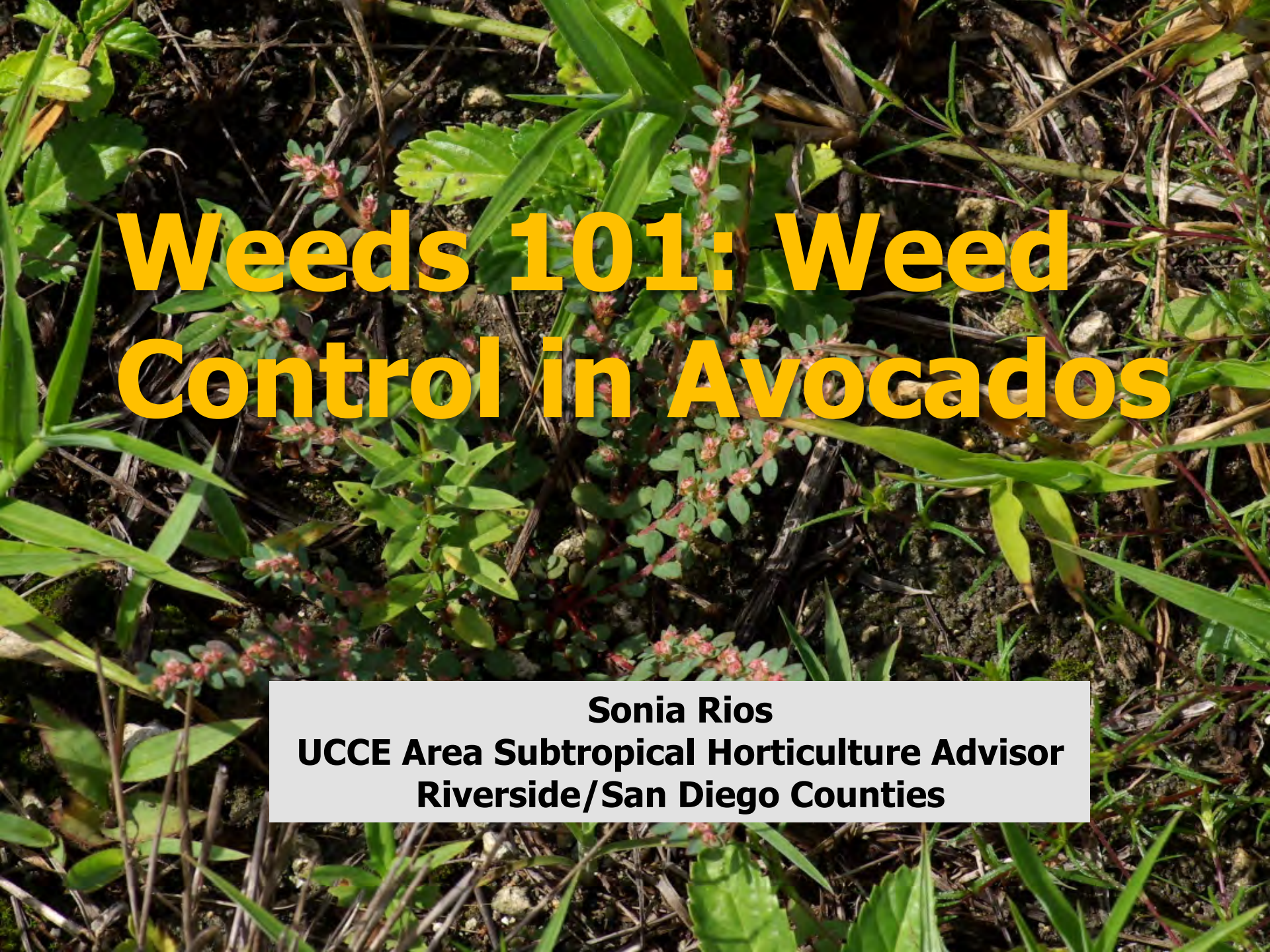

Weeds 101: Weed Control in Avocados

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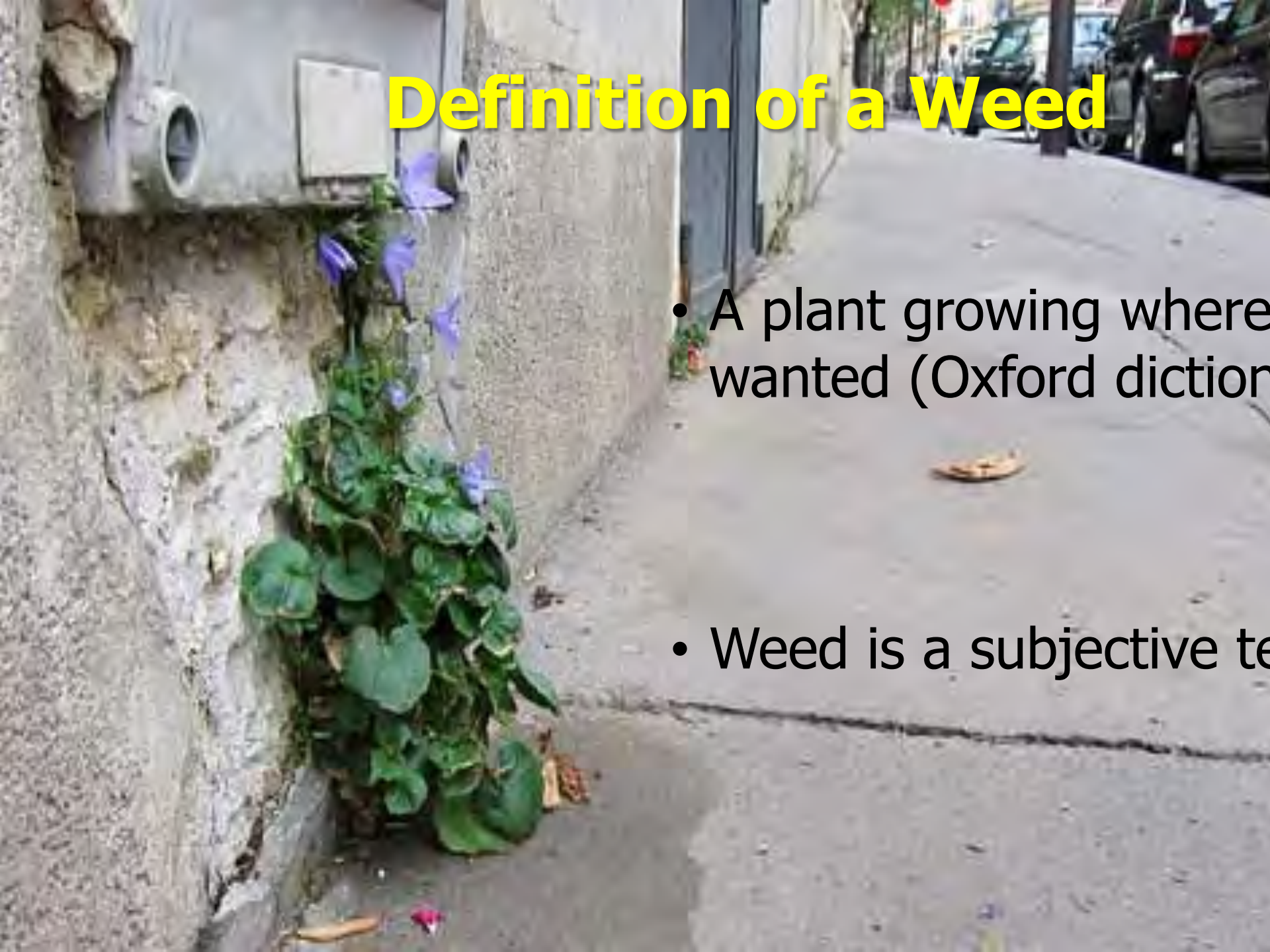


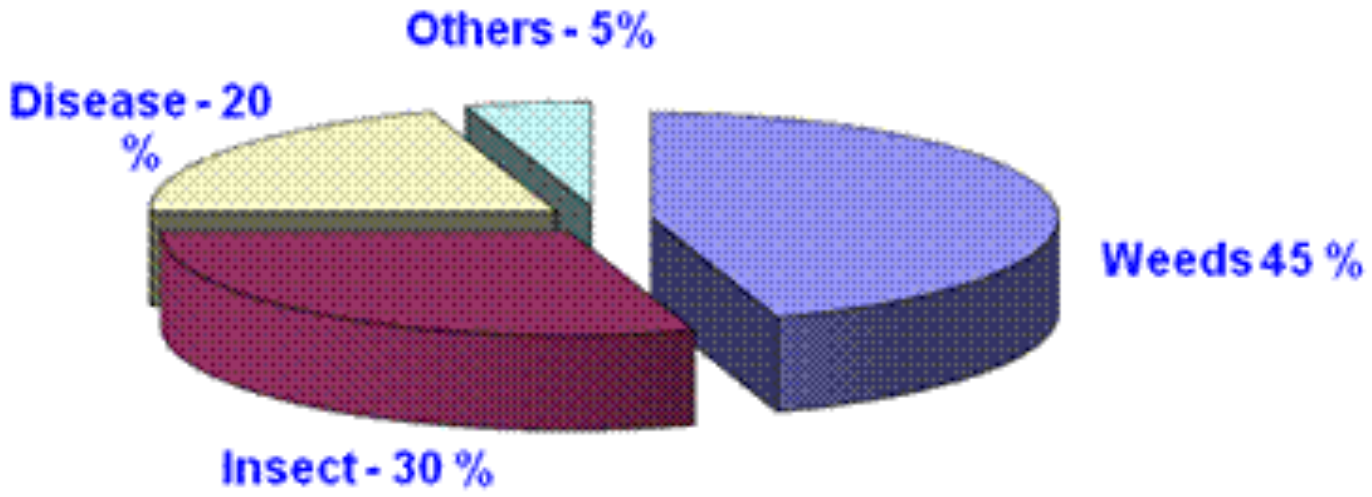
Definition of a Weed

- A plant growing where wanted (Oxford diction
- Weed is a subjective te

Why are weeds so successful?

- Abundant seed production
  - Also produce seed under adverse conditions
- Rapid growth and population establishment
- Seed dormancy
  - Long-term survival of buried seeds
- Self- and cross-pollinated
- Adaptations for spread
- Vegetative reproductive structures
- Capacity to occupy disturbed sites

Total annual loss in agriculture produce (%)



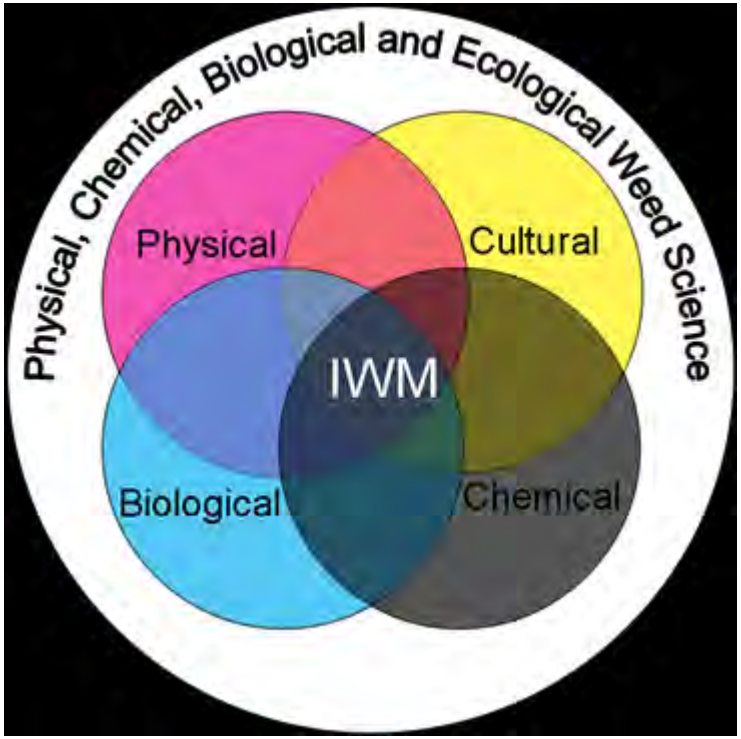
Border and roads become the primary location for weeds.

Integrated Weed Management (IWM)

- Combination of multiple management tools to reduce a pest population to an acceptable level while preserving the quality of existing habitat, water, and other natural resources.

Both short- and long-term goals

- Prevent or reduce weed spread
- Delay and/or suppress weed growth
- Prevent or suppress weed seed production
- Reduction of weed seed bank in soil

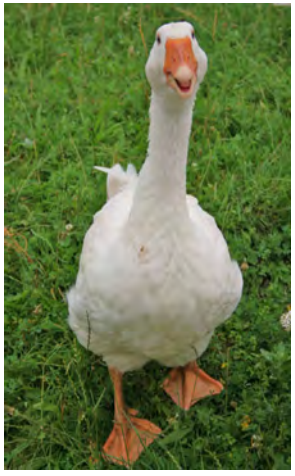


- Evaluate management options:
  - Mechanical
  - Chemical

- Used to efficiently suppress a pest population at the most effective/desirable points during the pest's lifecycle or growing season

Mechanical

- **Using animals, machines or other human-made tools to suppress weeds**



Chemical

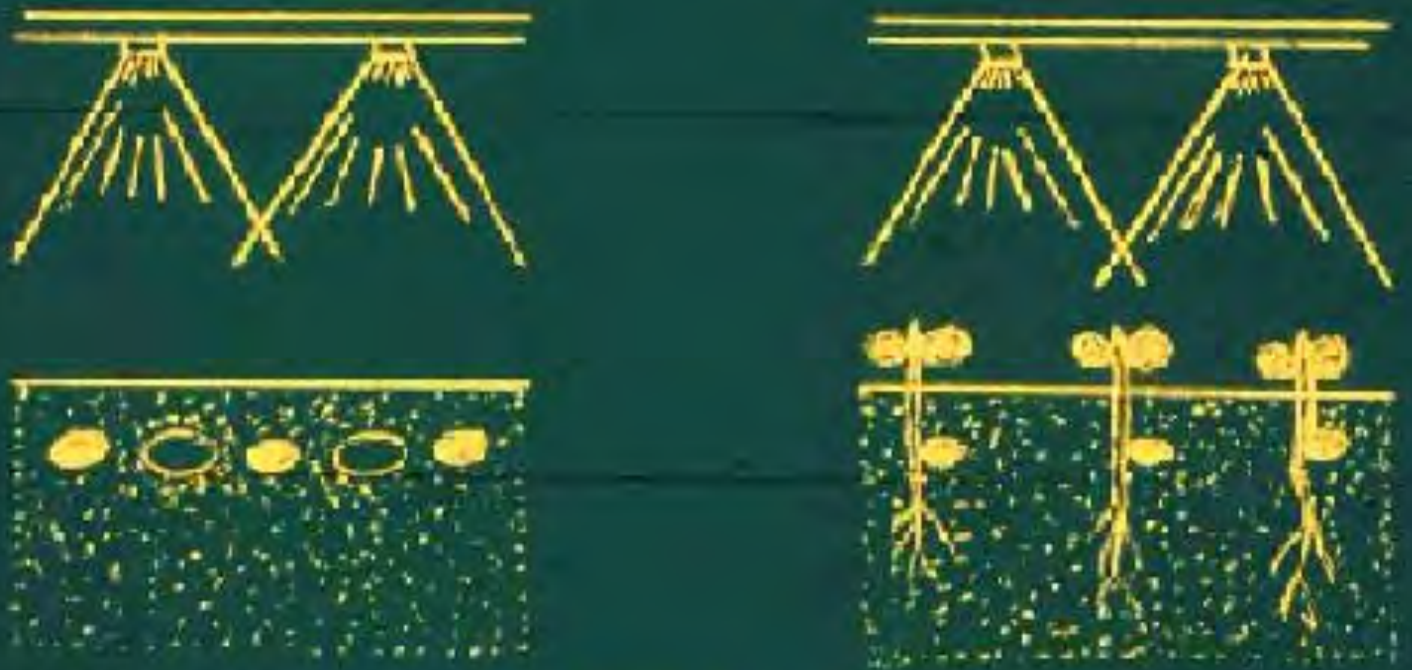
- Greater attention to herbicide selection and potential overspray or drift.
  - Plastic collars can be placed around young trees to protect them from some drift- no guarantee against damage.
  - Some herbicide products may only be labeled for nonbearing sites, meaning they can only be applied if a crop will not be harvested within 12 months.

- Herbicides are classified in several ways:
  - preemergent or postemergent
  - contact or systemic
  - selective or nonselective.

PRE-EMERGENCE TREATMENT

soil treatment
residual

foliage treatment
contact/translocated



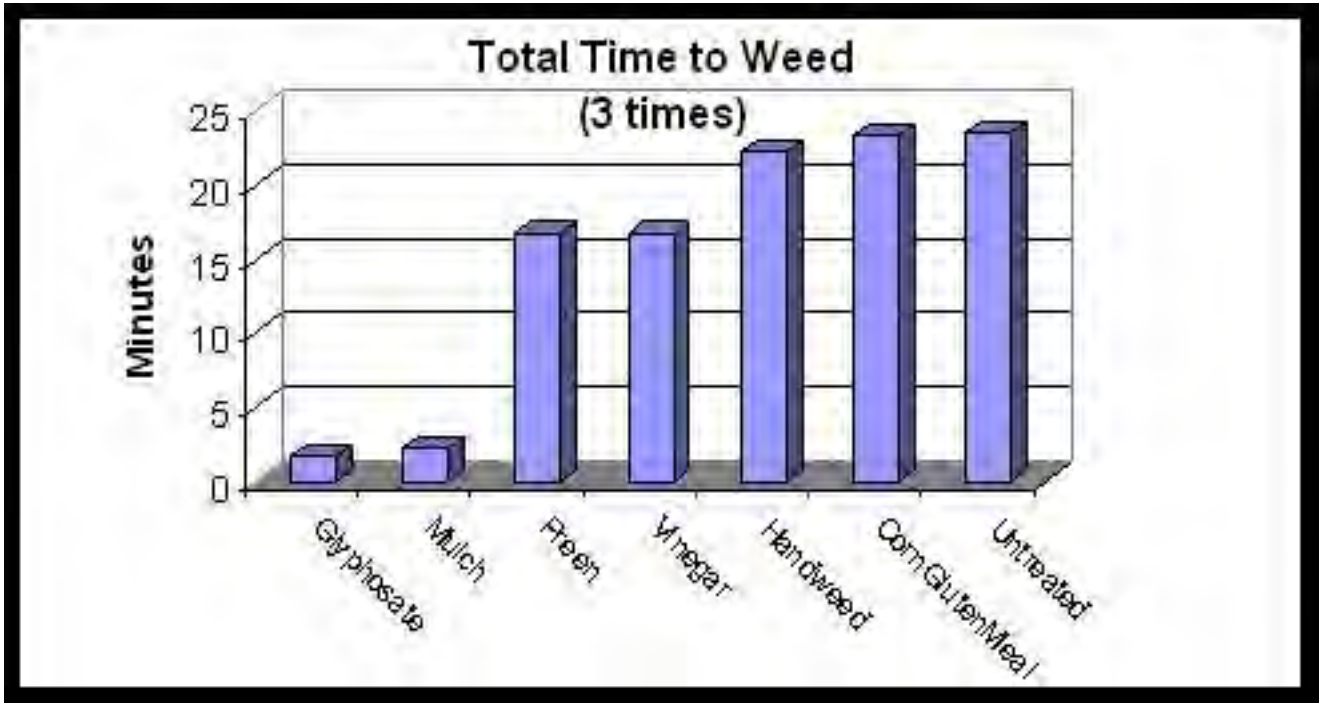
crop

weed

PRE (Applied in Soil)	POST (Contact spray)	Non-Bearing ONLY	
Chateau (flumioxazin)		X	
Trellis (Isoxaben)		X	
Solicam (norflurazon)			
Surflan (oryzalin)			
	Shark (Carfentrazone)		"Natural Herbicide"
	Matratec (Clove Oil)		
	diquat	X	
	Fusilade (fluazifop-p-butyl)	X	
	Roundup (Glyphosate)		
	Gramoxone Onteon (paraquat)		"Natural Herbicide"
	Scythe (pelargonic acid)		
	Poast (sethoxydim)	X	

Always consult a current label before using any herbicide as labels change frequently and often contain special restrictions regarding use

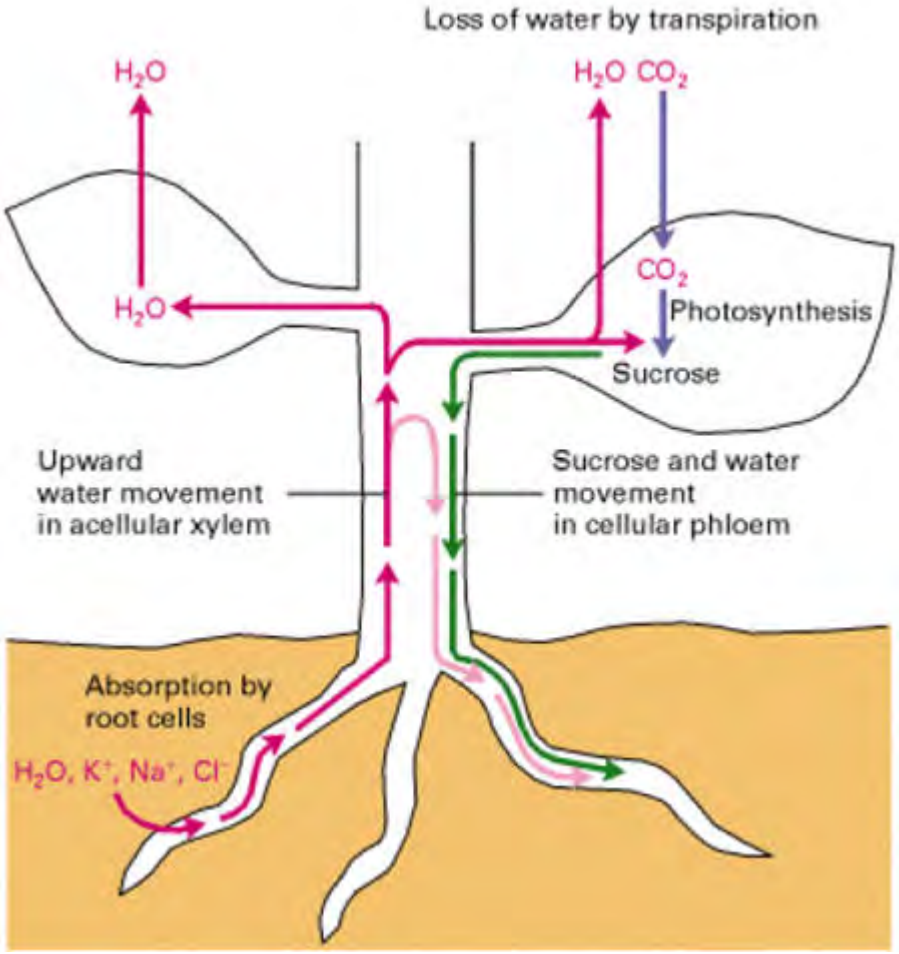
So the question is: Are natural herbicides safe and effective?



- If used as part of an IPM/IWM, the contact herbicides fit very well.
- Should know that they won't get the same kind of long-term weed control as products containing glyphosate (e.g., Roundup).
- User should also be aware that many of the plant based or "natural" products can cause skin irritation or eye or lung problems.
- Eye protection and gloves as well as any other label requirements should be worn when using these natural herbicides, even if they are listed as exempt products.

Always consult a current label before using any herbicide as labels change frequently and often contain special restrictions regarding use

Do not apply herbicides on a stressed weed!!



First step in weed management

What are you dealing with?

The first step in understanding any problem is to correctly identify it

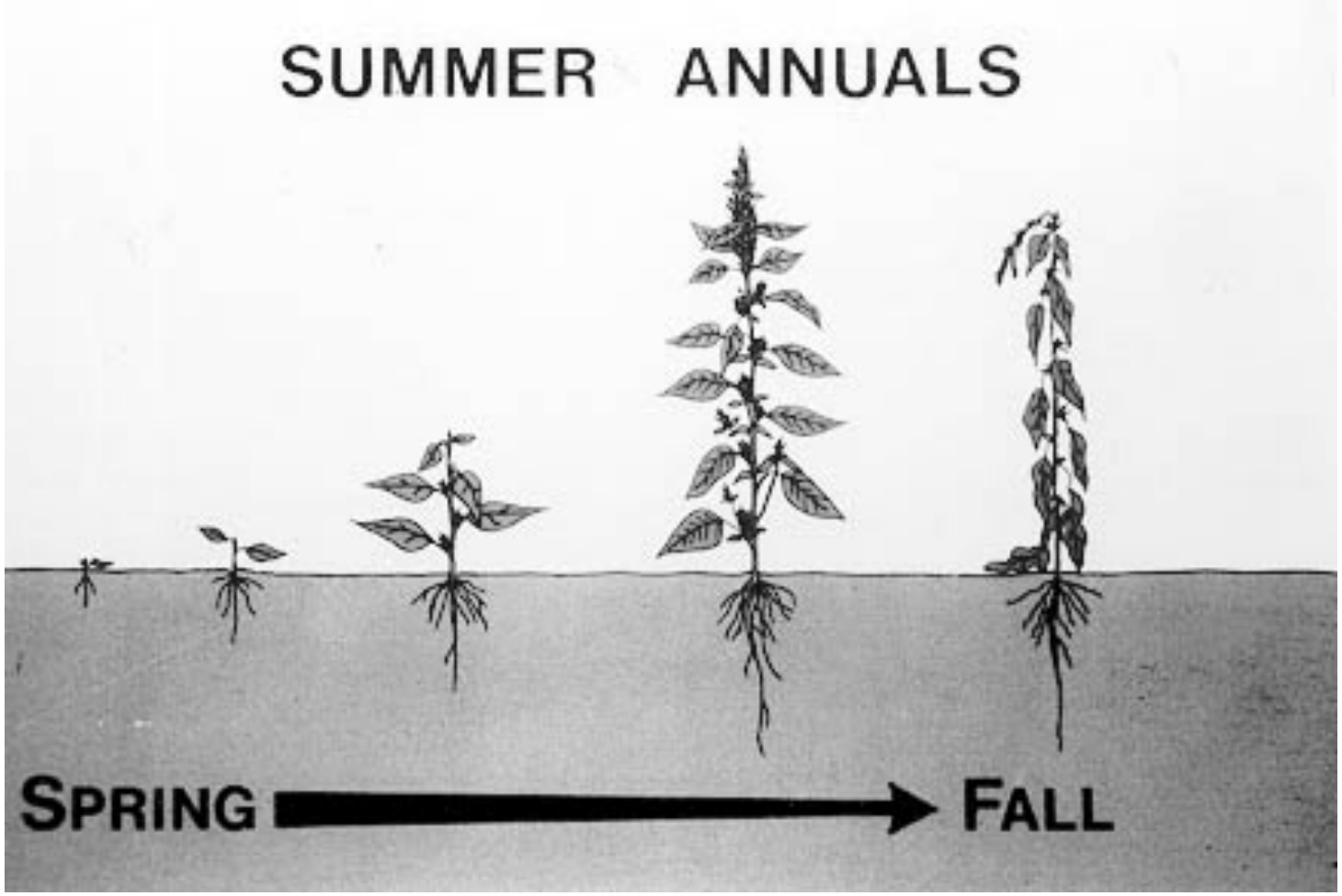
http://ipm.ucdavis.edu/PMG/menu.weeds.html

Other considerations

- **Weed Biology**
  i.e. annuals, biennials, or perennials
- **Life form**
  i.e. "monocots," Grasses & sedges or "dicots," broadleaves
- **Morphology**
  i.e. Leaf surface area, angle and texture
- **Growth and development**
  i.e. Plant size, plant maturity, plant responses to stress
- **Genetics**
  Development of herbicide resistance

Herbicide Application Timing

Table 2. Effect of glyphosate rate and timing on control	
Hairy fleabane growth stage and lb ai/A for good control	**Horseweed growth stage and lb ai/A for good control**
3-6 leaf = 0.5	5-8 leaf = 1.0
7-12 leaf = 1.0	11 leaf to 4" bolted = 2.0
13-19 leaf = 1.5	4" to 12" bolted = 4.0
20-21 leaf = 2.0	
>25 leaf = erratic	
Prather, UC KAC 1999 and Shrestha et. al., UC KAC	



Annuals are plants that grow and complete their life cycle in one year.

- Summer annuals have a similar growing season to corn and soybean.
- Most common type of weed in annually tilled fields.
- Lambsquarters, foxtail, crabgrass, purslane, Palmer amaranth, and common waterhemp

Summer Annual Broadleaf Weeds

Pigweed - *Amaranthus blitoides*
(May have reddish stem and taproot)

Purslane - *Portulaca oleracea*
(Fleshy leaves)

Spurge - *Euphorbia supina*
(Milky sap distinguishes from knotweed)

Oxalis (Yellow Woodsorrel) - *Oxalis stricta*
(Heart-shaped leaves)

Winter Annuals

Henbit

Mares Tail

Curly Dock

Shepherds Purse

Pennycress

Tansy Mustard

- Winter annuals germinate in late summer or fall.
- They are dormant over the winter, then resume growth in the spring, flower and produce seed in mid to late spring, and die in the summer.
- Winter annual weeds can pose problems in fall–seeded crops, early spring grains, pastures, and no–till fields.

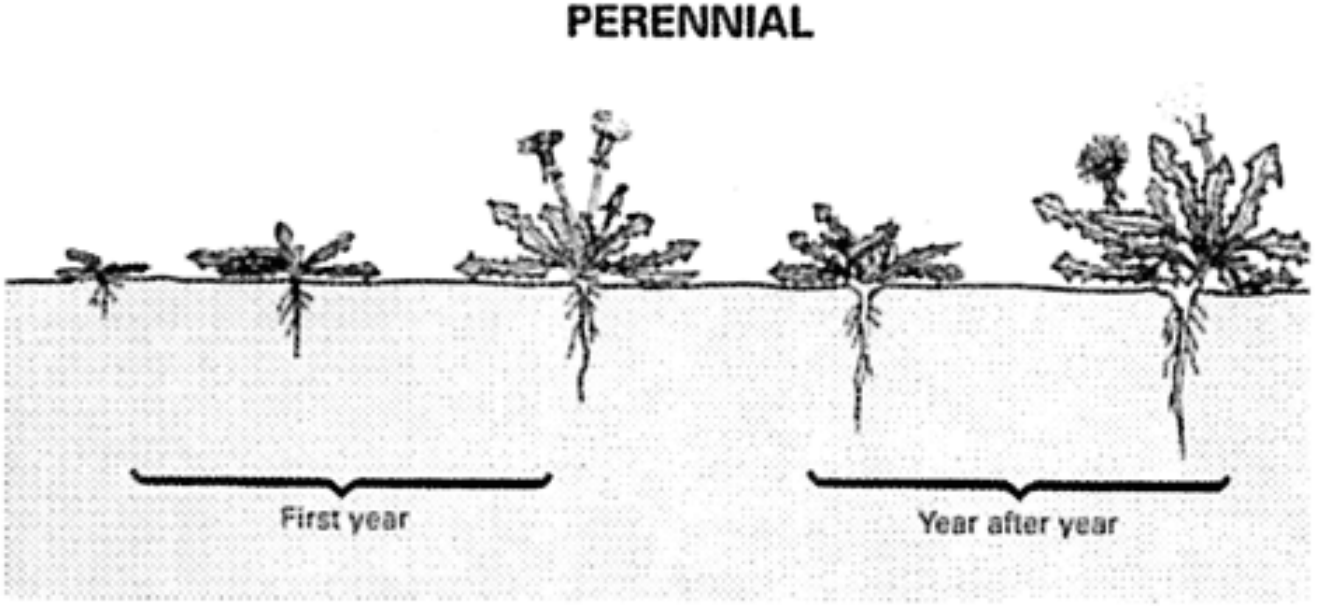


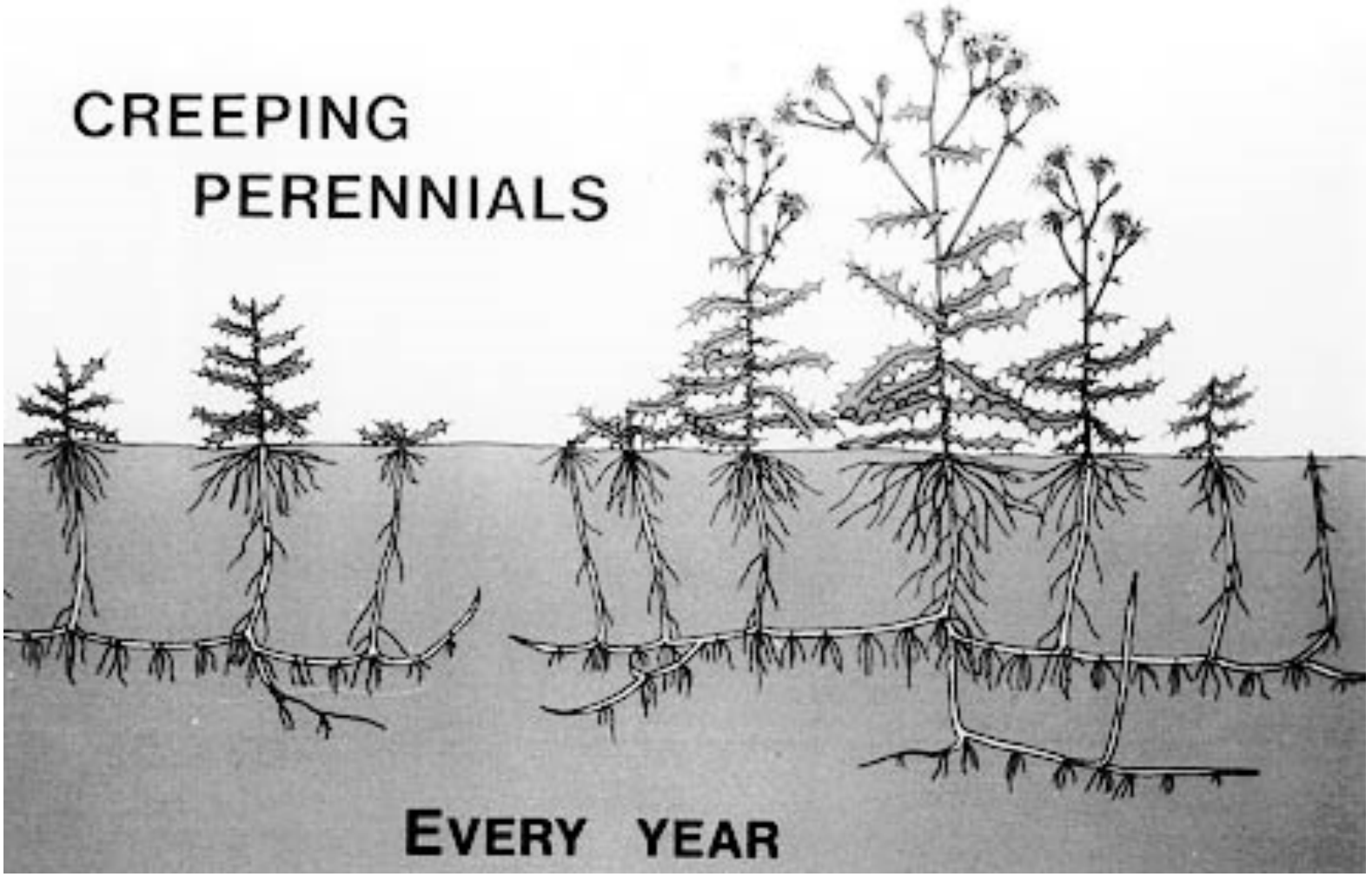
Figure 3.4 Life cycle of a perennial weed.

- Live multiple years
- Re–grow each season from underground overwintering structures. R
- Reproduce vegetatively and/or by seeds.
- Typically inhabit no–till fields, pastures, roadsides, &, occasionally, tilled fields.
- Herbaceous perennials can be grouped into two classes, simple and creeping.
- Simple perennials usually have taproots and reproduce by seed.
- Creeping perennials can reproduce by seed & vegetatively by rhizomes, tubers, stolons, budding roots, and bulbs.

As tillage increases, incidence of perennials increases: Why?

- Tillage breaks vegetative structures into pieces that can regenerate into new plants, potentially spreading the infestation within or between fields.

- May require either repeated efforts or a combination of management tactics to achieve adequate control.



Bermudagrass

White Clover

Common Blue Violet

Dandelion

Creeping Charlie

Yellow Nutsedge

\Nutsedge in Lawn

Oxalis

Methods of weed seed dispersal include:

- wind–blown seeds (dandelions)
- animals or humans moving burs (cockleburs, foxtail)
- thorns or stickers transporting parts of plants to new locations (Canada thistle, "goat heads")
- birds that ingest weed seeds and then excrete them in different places (Mulberries!!)

- Humans
  - moving soil or compost
  - moving weed seeds or plant parts with tillage equipment
  - planting nonnative plants that become invasive weeds
  - planting desirable plant seeds that are contaminated with weed seeds.

Weed seed longevity

Species	Years
Barnyardgrass	5
Common purslane	20-25
Velvetleaf	15-40
Puncturevine	15-20
Shepherd’spurse	15-35
East. black nightshade	40+
Cheeseweed	200
Burclover	200

Scouting

Avocado Trees

- Younger trees allow more light to reach orchard floors, promoting greater weed growth that can lower yield by 23-33% compared to mature groves (Singh and Sharma 2008).

- Mature trees generally tolerate higher herbicide rates and thus younger groves require.

- Weeds can impact tree growth and yields by:
  - altering the spray pattern of low volume irrigation systems
  - intercepting soil-applied chemicals (fertilizer and agricultural chemicals
  - interfer with pruning/ harvesting operations
  - favorable environment for pathogens that infect the trunk and roots

Mulch

- Using organic materials as mulch can help:
  - increase soil organic matter
  - promote soil biological activity
  - enhance soil structure, water infiltration, and aggregate stability.

- The amount of mulch required for effective weed suppression varies with the type of mulch used.

Cover crop benefits and complications

- Vegetated orchard floors can accentuate frost hazard, often experiencing 3-5°F cooler ambient temperatures than do bare orchard floors, depending on vegetation height and atmospheric conditions (Steinmaus 2014).

- Alternatively, ground cover in the row middles can reduce soil erosion, reduce sand blasting during windy conditions & help retain nutrients.

- Beneficial if they are less competitive than other weeds potentially present in the grove

- Water requirements for vegetation regrowth

Organic groves

- Growers rank weeds as the number one barrier to organic production (Walz, 1999).

- In approaching weed management within an organic system, it is important to remember the central goal: to reduce weed competition and reproduction to a level that the farmer can accept - many cases, this will not completely eliminate all weeds.

- Mulch
  - By altering light, soil moisture, and soil temperature, mulches limit the germination and growth of weed seedlings.

Summary

- Weeds can germinate and grow in many different environments, rapid seedling growth that allows them to be competitive quickly, ease of pollination, the ability to reproduce vegetatively, and the ability to tolerate adverse environmental conditions.

- Different management strategies are necessary for different weed problems.

- Each type of weed control has its advantages and disadvantages.

- Only through routine monitoring will you be aware of developing weed problems.

- Important to correctly identify the weed species you target for control, understand their life cycles, and base your control strategies on all factors involved.

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UC IPM WEBSITE:
http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html.
(Help ID/Treat species in commodity)

http://www.wssa.net/Weeds/Resistance/WSSA-Mechanism-of-Action.pdf

Always consult a current label before using any herbicide as labels change frequently and often contain special restrictions regarding use