

Weed Biology for Central Coast Vineyards

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Weeds in the vineyard

If you don't do anything to control weeds they will take over



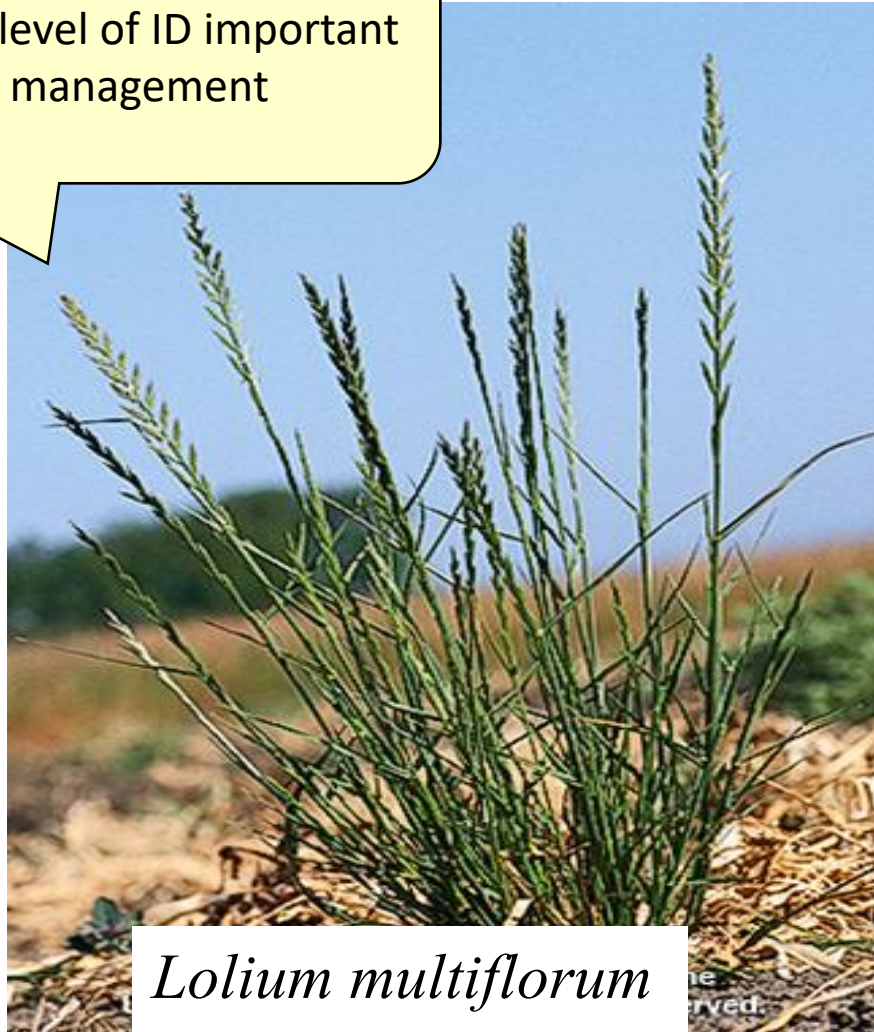
Impacts of weeds in vineyards

- compete with vines for nutrients, water, and sometimes light
- interfere with harvest and cultural operations
- harbor pest vertebrate and invertebrate and diseases (but also beneficials)
- increase threat of frost
- poor aesthetics



Weed ID: Monocot vs. dicot

The first level of ID important to management



Lolium multiflorum
ryegrass



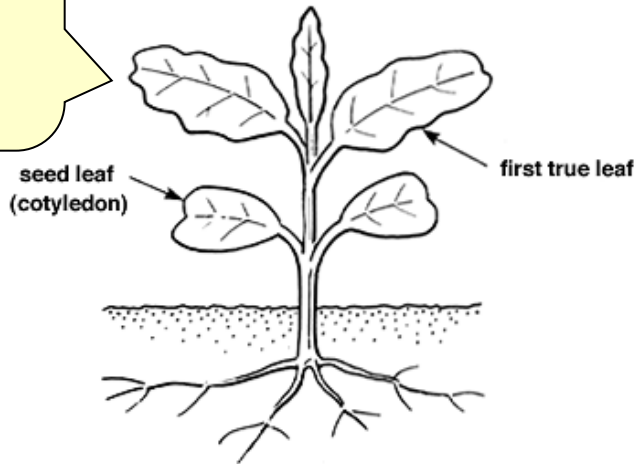
UC Statewide IPM Project
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Conyza canadensis
horseweed

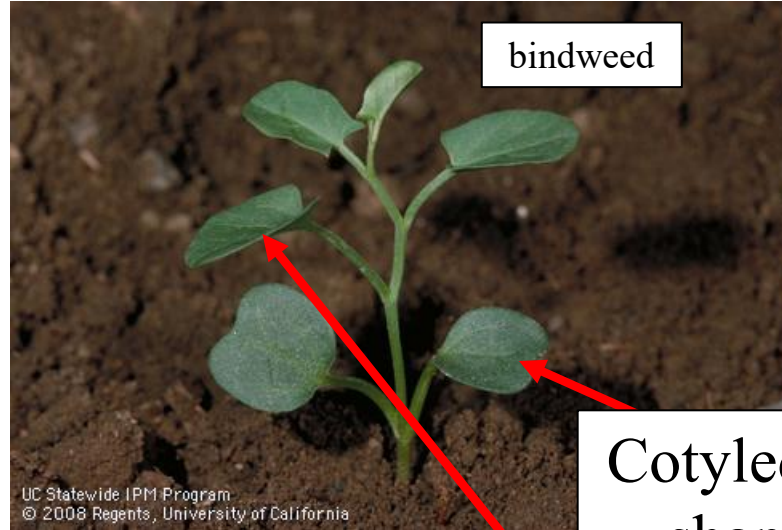
Conyza bonariensis
Hairy fleabane

Dicot seedling identification characteristics

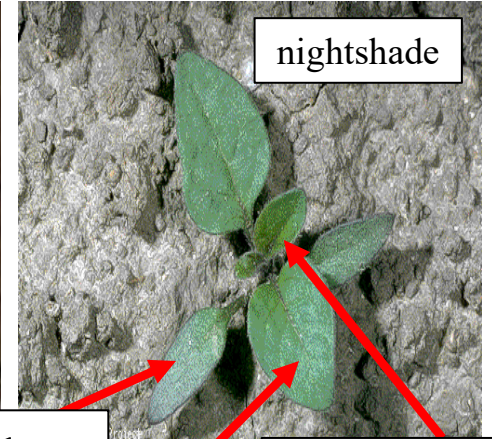
Leaf margins (serrated, smooth, lobed)



BROADLEAF SEEDLING



bindweed

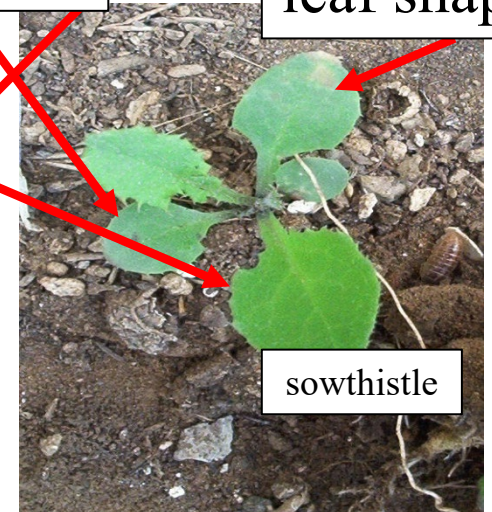


nightshade

Cotyledon shape

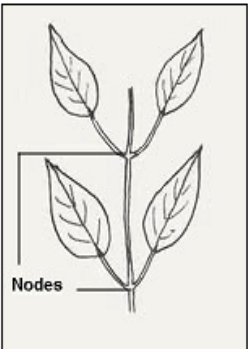
2nd true leaf shape

1st true leaf shape

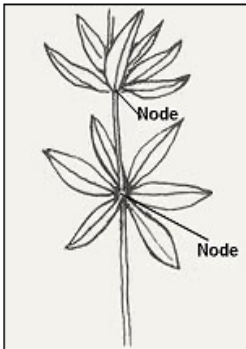


sowthistle

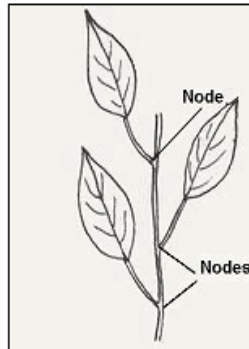
Leaves are opposite (2 leaves per node)



Leaves are whorled (3 or more leaves arranged around a node)



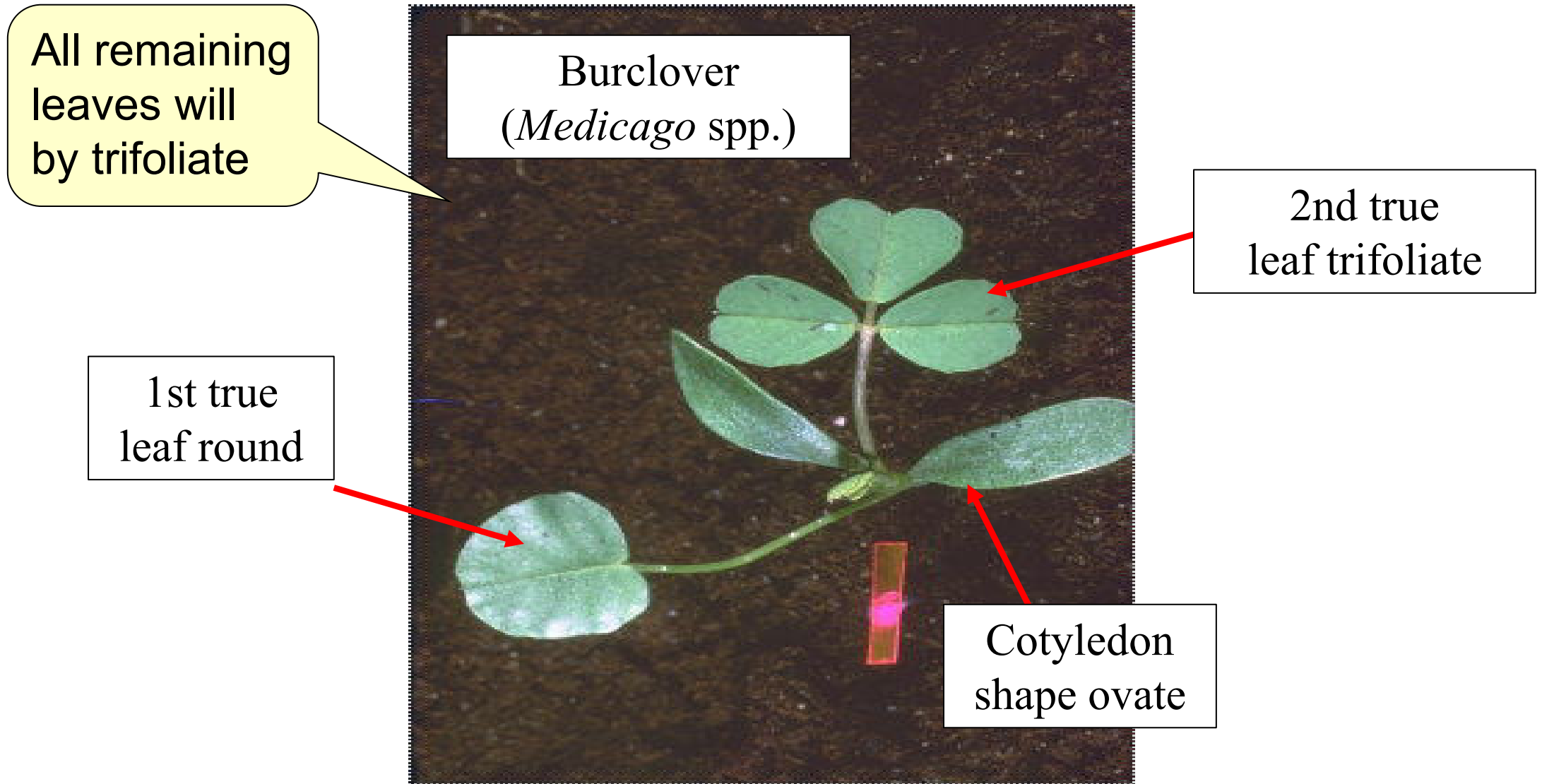
Leaves are alternate (1 leaf per node)



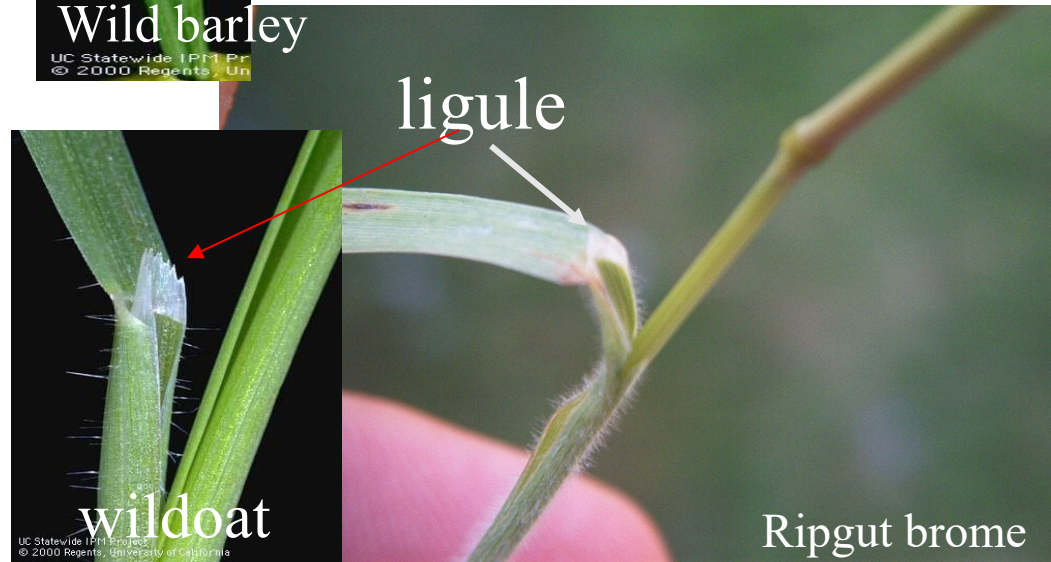
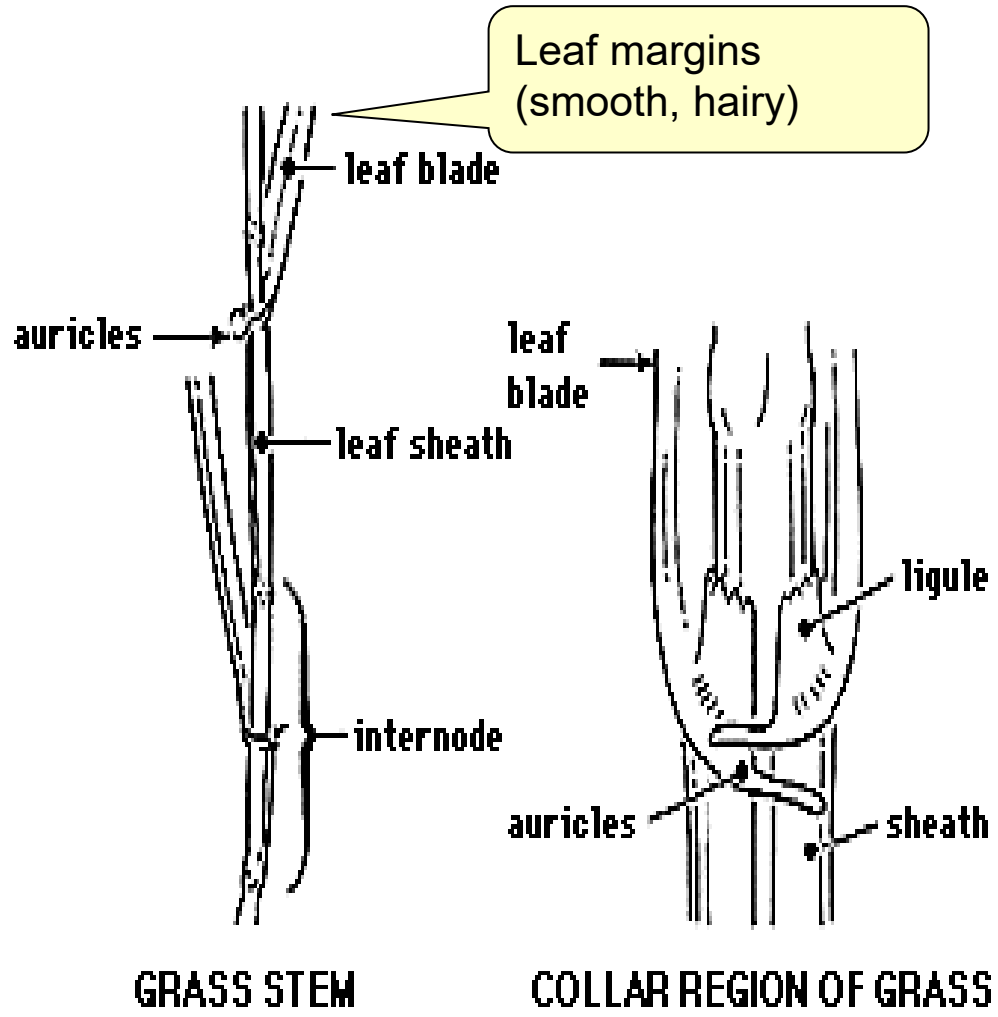
Leaves form a basal rosette (1 leaf per node, but clustered around the stem at ground level)



Dicot seedling: clovers are tricky



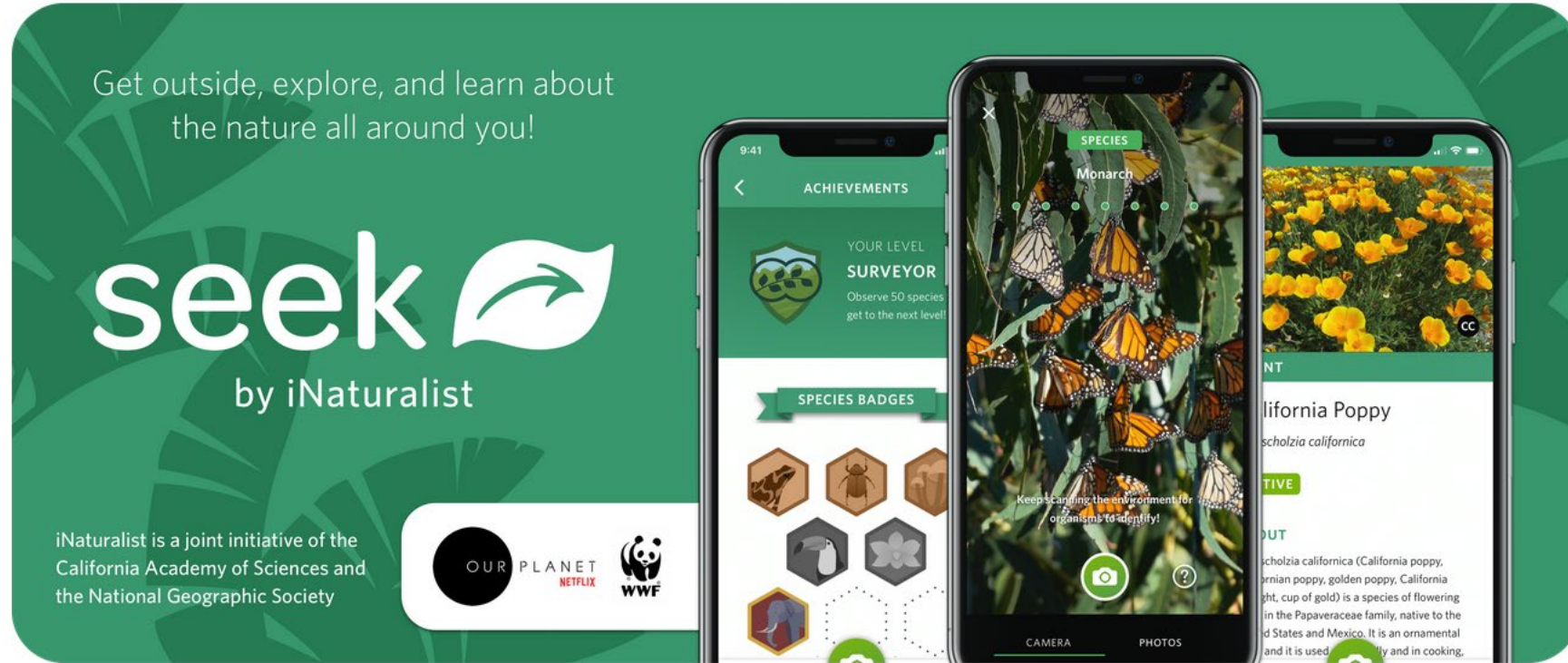
Monocot seedling Identification



Weed ID: cell phone apps

Seek by iNaturalist

https://www.inaturalist.org/pages/seek_app



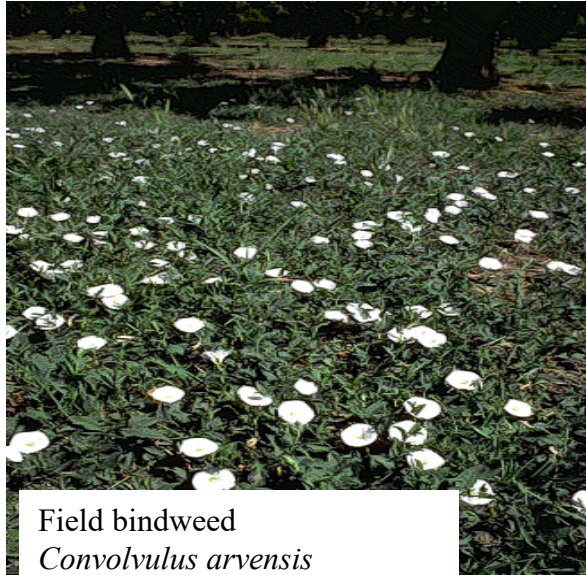
<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=27731>

- ID Weeds U of Missouri
- PlantNet

Common Broadleaf weeds

- Horseweed
- Bristly Ox tongue
- Sowthistle
- Malva
- Mustard
- Bindweed
- Pigweeds
- Purslane
- Lambsquarters
- Spurge
- Nightshade
- Knotweed
- Atriplex
- Turkey Mullein
- Beggarticks*
- Stinkwort*

*relatively new weeds we see at Cal Poly



Field bindweed
Convolvulus arvensis



Common mallow
Malva parviflora



Stinkwort
(Dittrichia graveolens)

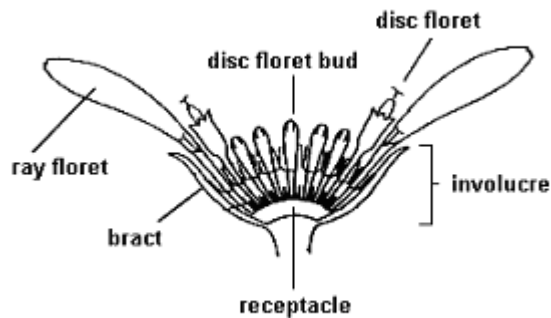


Hairy beggarticks
Bidens pilosa

Common Asteraceae vineyard weeds



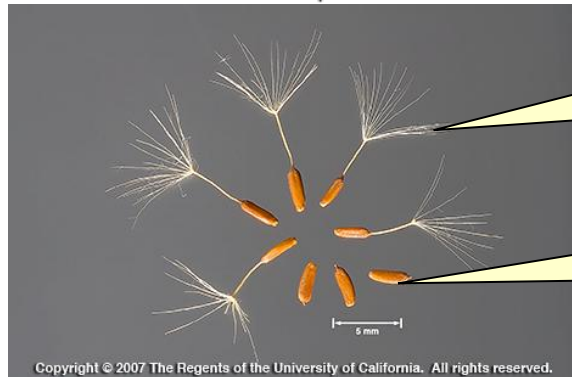
Asteraceae seedlings often emerge as rosettes (stinkwort)



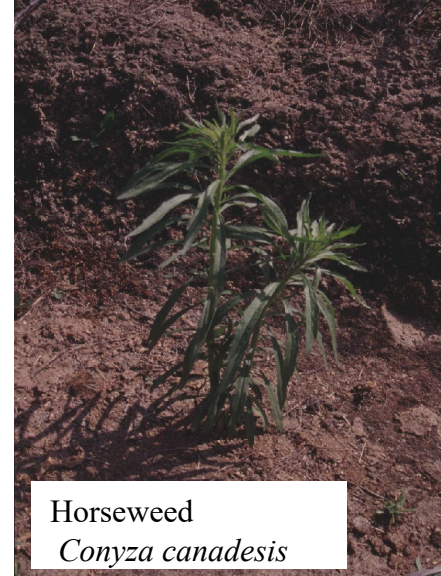
Asteraceae flowers have ray flowers and disc flowers

Asteraceae seeds (achenes) from disc flower have a pappus for long distance transport

(achenes) from ray flowers have no pappus for short distance transport



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Horseweed
Conyza canadensis



Bristly ox tongue
Picris echioides



Annual sowthistle, *Sonchus oleraceus*

Another up and coming weed in vineyards

Kickxia elatine (sharp-pointed fluvellin)



Common Grass weeds

- Wild Barley
- Wild Oats
- Ryegrass
- Annual bluegrass
- Bromes
- Barnyardgrass
- Bermudagrass
- Kikuyugrass
- Foxtail
- Nutsedge

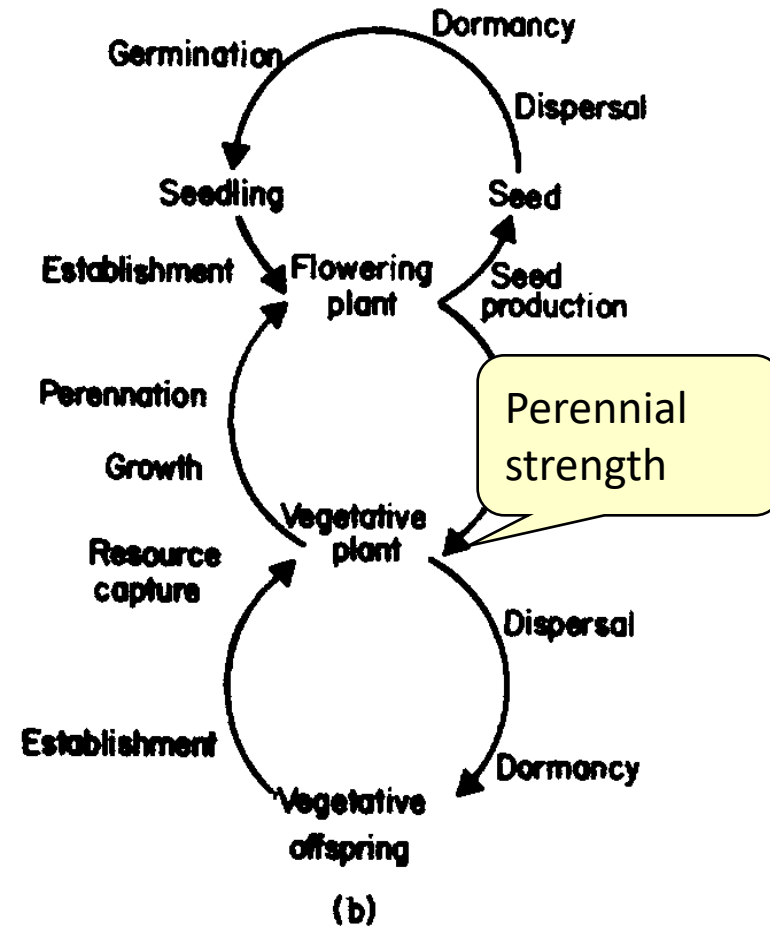
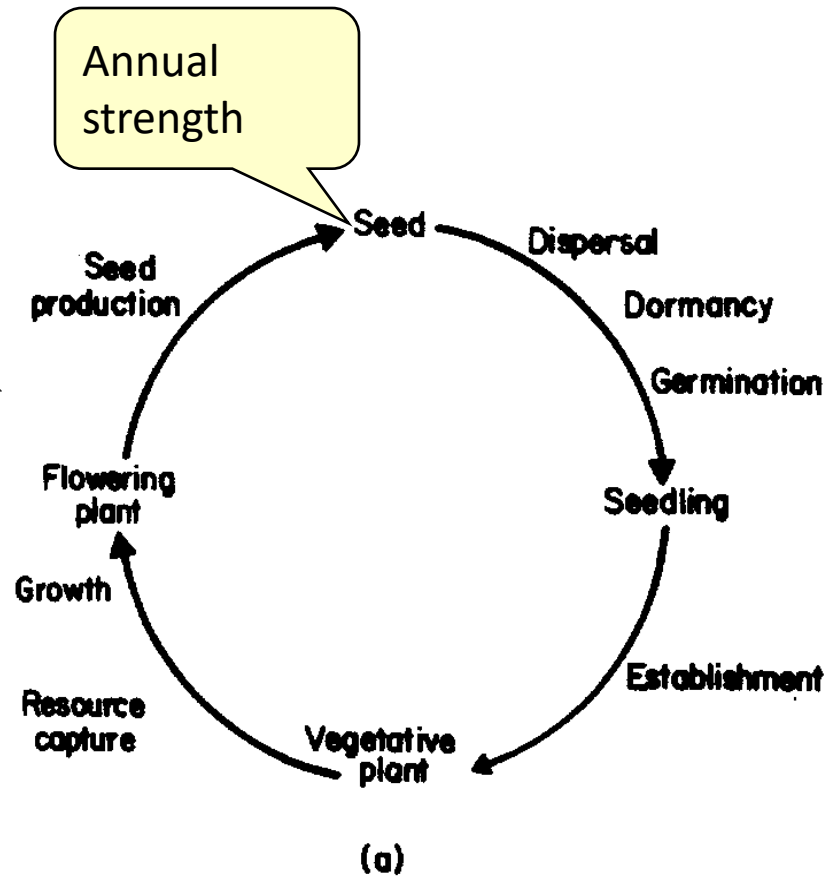
Wild (hare)
barley: auricles
jagged ligule

Wild oat: no
auricles, long
ligule

wheat



Life cycle classification



- Annuals: less than a year
- Biennials: between one and two years
- Perennials: more than 2 years

Summer annuals



Amaranthus retroflexus
Redroot pigweed



Portulaca oleracea common purslane



Echinochloa crus-galli Barnyardgrass

Winter annual



Sonchus oleraceus
Annual sowthistle



Brassica rapa Birdrape mustard



Lolium multiflorum
Italian Ryegrass

Annual winter/summer

Malva parviflora
Small mallow



Strength of an annual: SEED



Redroot pigweed
(*Amaranthus retroflexus*) flower



The small black dots are
the mature seed

DORMANCY: unpredictable germination
LONGEVITY: long lived
SEEDBANK: memory and momentum

Simple perennials

Taraxacum officinale
dandelion

Simple perennials
propagate (spread) by
seed



Creeping Perennial

→by seeds and rhizomes (*Sorghum halpense*—Johnsongrass),
Horizontal underground extension of main stem.
—modified stem with buds (nodes)



Creeping perennial

→ tubers (*Cyperus esculentus*--yellow nutsedge), swollen ends of rhizome (also has buds), thickened underground modified stem borne on a rhizome.



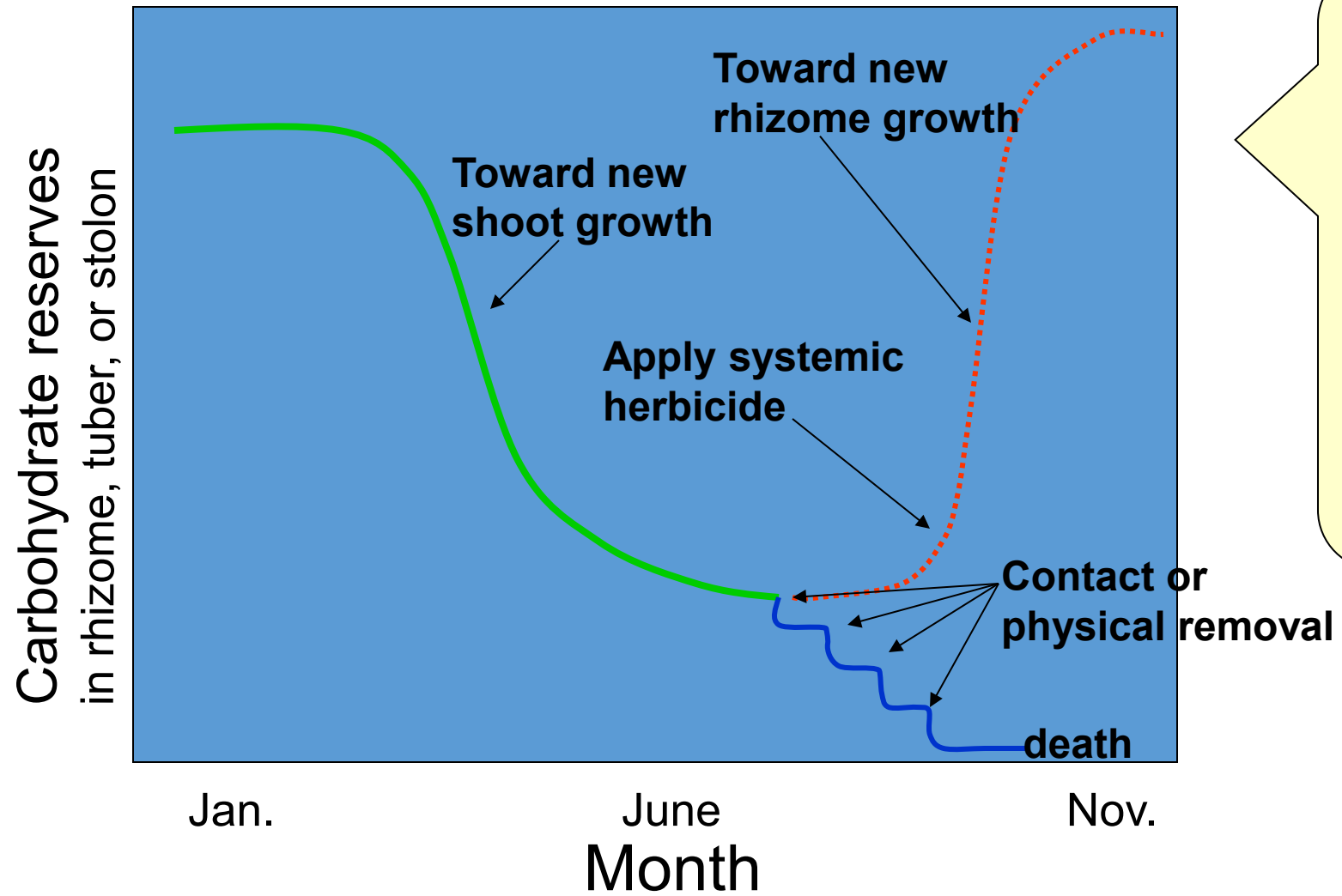
Creeping perennials → stolons

→ stolons (Bermudagrass---*Cynodon dactylon*), horizontal above ground branches of main stem (also modified stem with buds→nodes), at each node roots grow down into soil and shoots grow up.



Timing for perennial control

Not determined by impact on crop—determined by biology of weed!



Timing for control of annuals is EASY → germinating seed or newly emerged seedling DO NOT ALLOW SEED SET

Weeds are an indicator of poor conditions

Any place not optimal for crop performance: bad soil, salt, etc.

Too dry or too wet

Planting gaps

Seedbed not prepared properly: clods, hardpan, cultivation mistakes, etc.

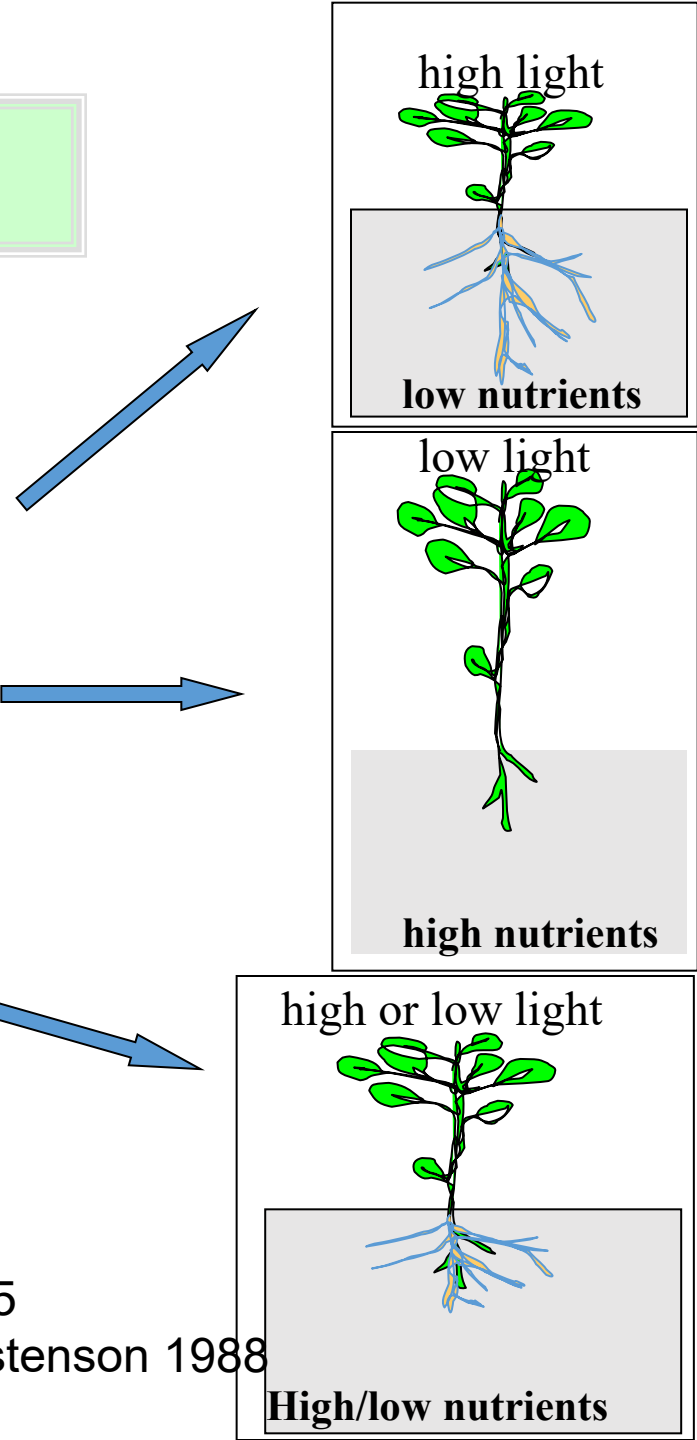
Where fertilizer is applied at too high or low rates



Weed Plasticity

- Root:shoot ratio
 - **high** when water/nutrients are low and light high
 - **low** when water/nutrients are high and light is low
- Domesticated crop species maintain a relatively constant root:shoot ratio

Weeds will adjust their root:shoot ratio until ALL resources are EQUALLY limiting to growth



Bloom et al. 1985
Martin and Thorstenson 1988

Summary

- Weed identification: control implications
- Grasses vs. broadleaves
- Life cycles: annual, perennial
- Weed competition