

Landscape Weed Management

- Site Preparation
- Sanitation & Exclusion
- Mulches
- Preemergence Herbicides
- Postemergence Herbicides
- Hand weeding

Preemergence Weed Control

Before Weeds Emerge

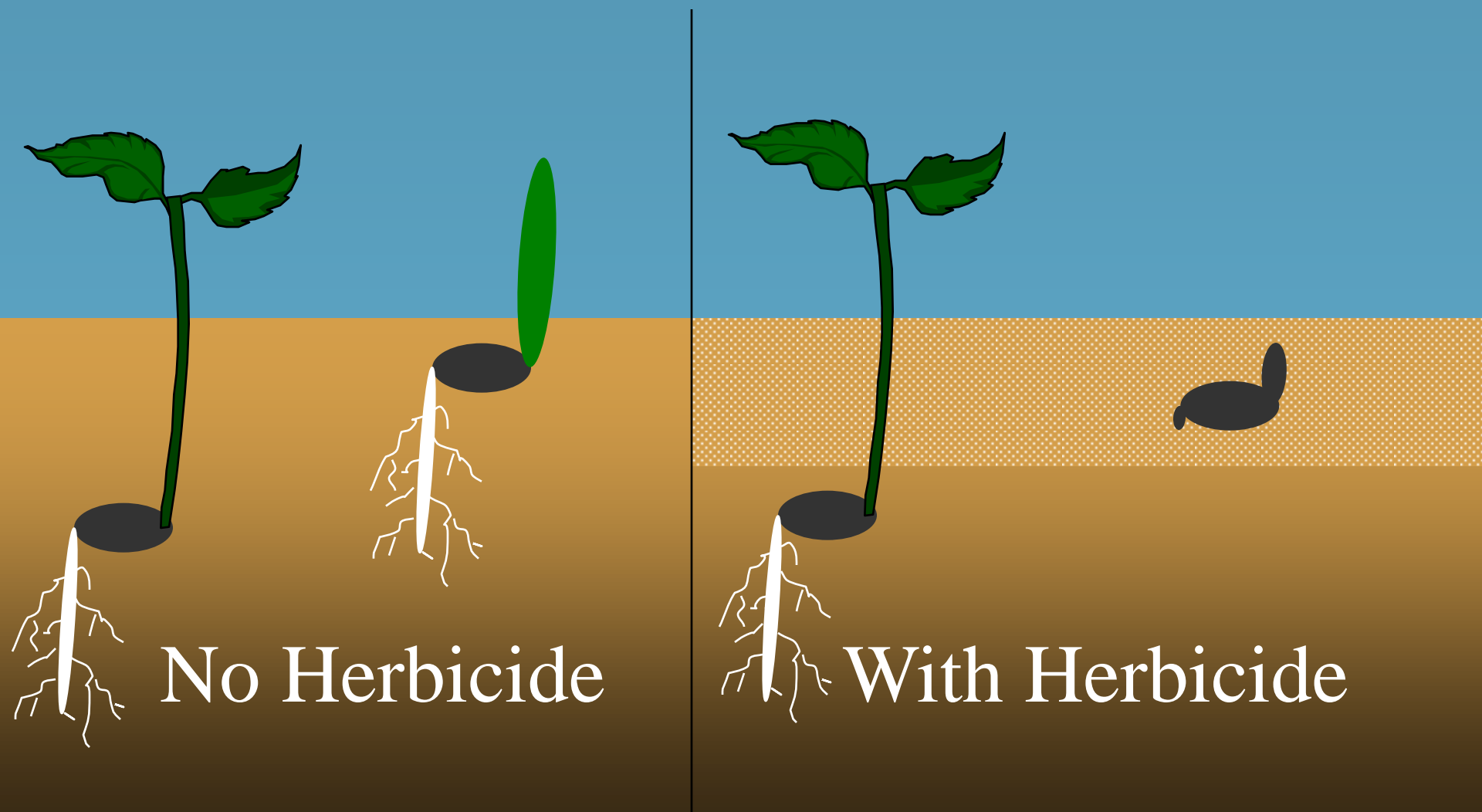
-- more importantly --

Before Weeds Germinate

Preemergence weed control options

- Mulches prevent germination and establishment by excluding light
- Preemergence Herbicides
Prevent seedling establishment

Preemergence Herbicides Prevent Seedling Establishment



No Herbicide

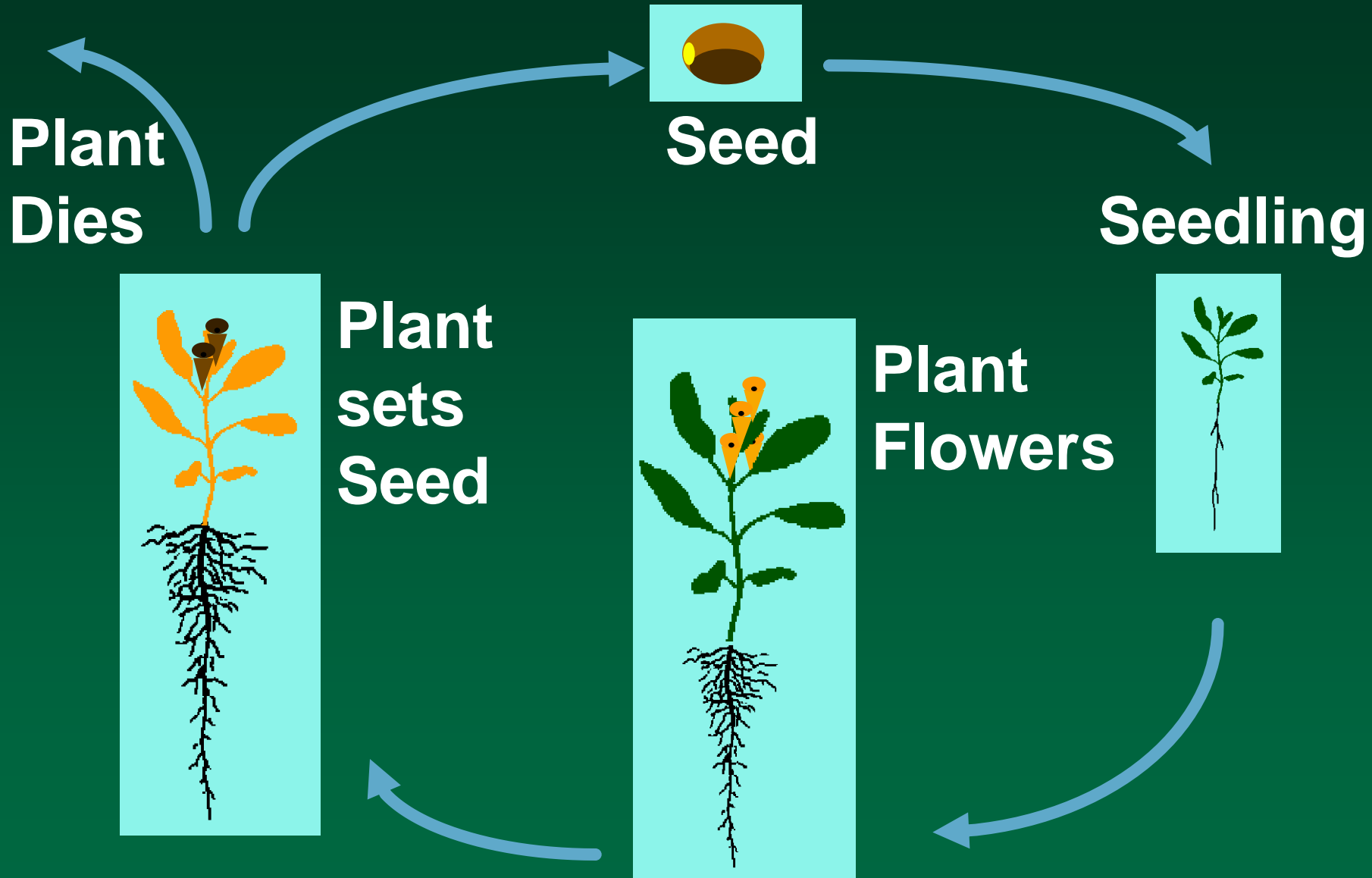
With Herbicide

Application timing is everything to effective control

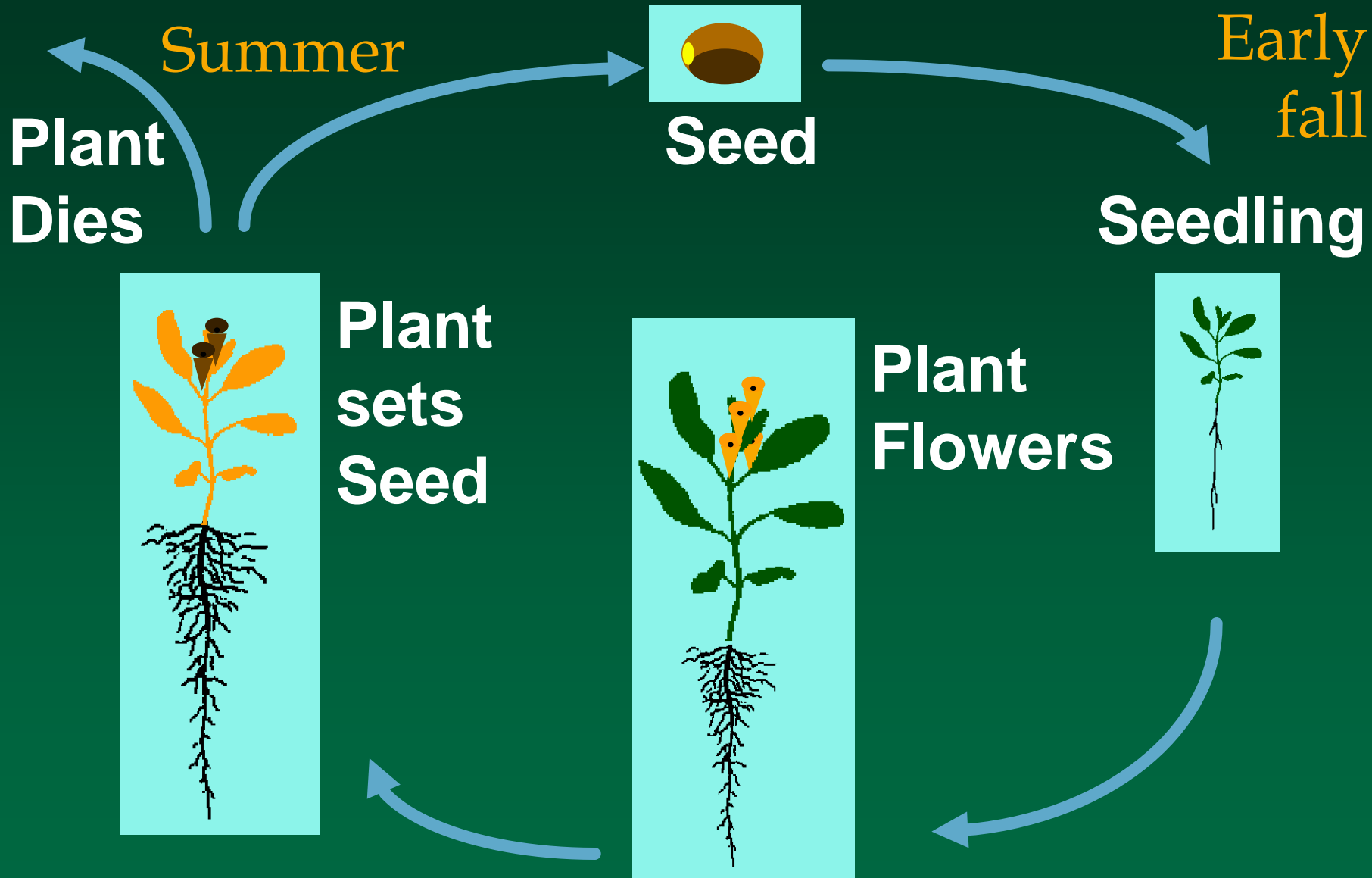


- Preemergence means before weeds germinate.
- Applications must be made about 2 weeks before germination
- Timing depends on the weed's life cycle

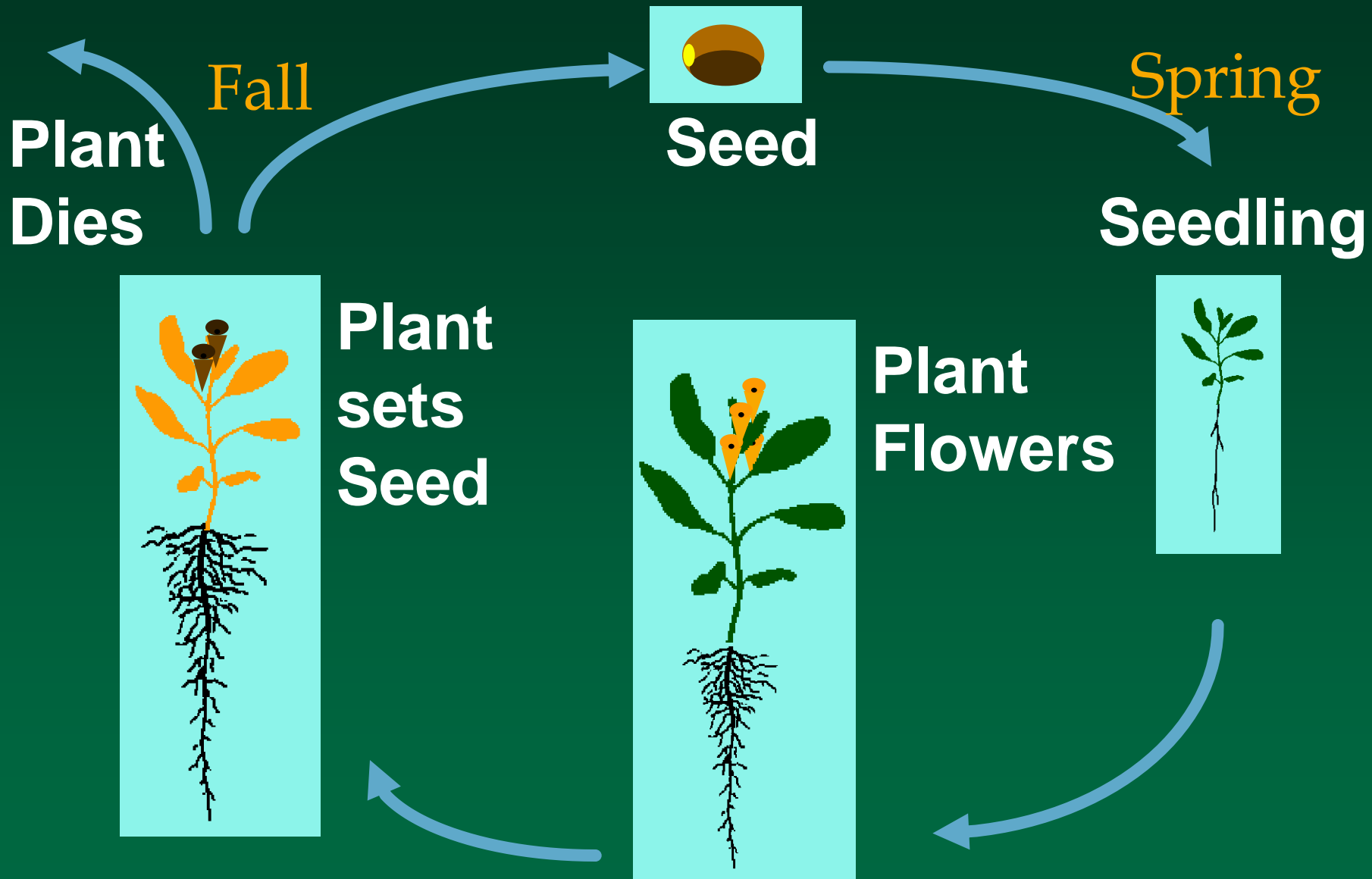
Life cycle of an annual weed



Life cycle of a winter annual weed



Life cycle of a summer annual weed



Life cycle of a biennial weed

Plants
flower &
set seed
in 2nd
season

Seed



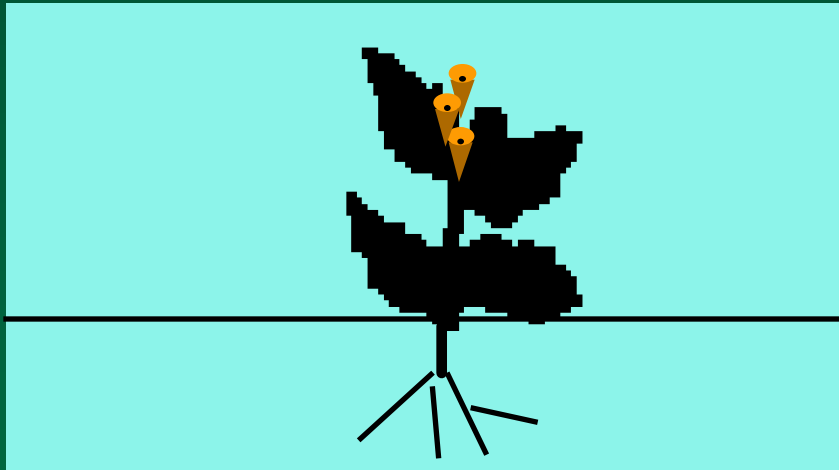
Seedling



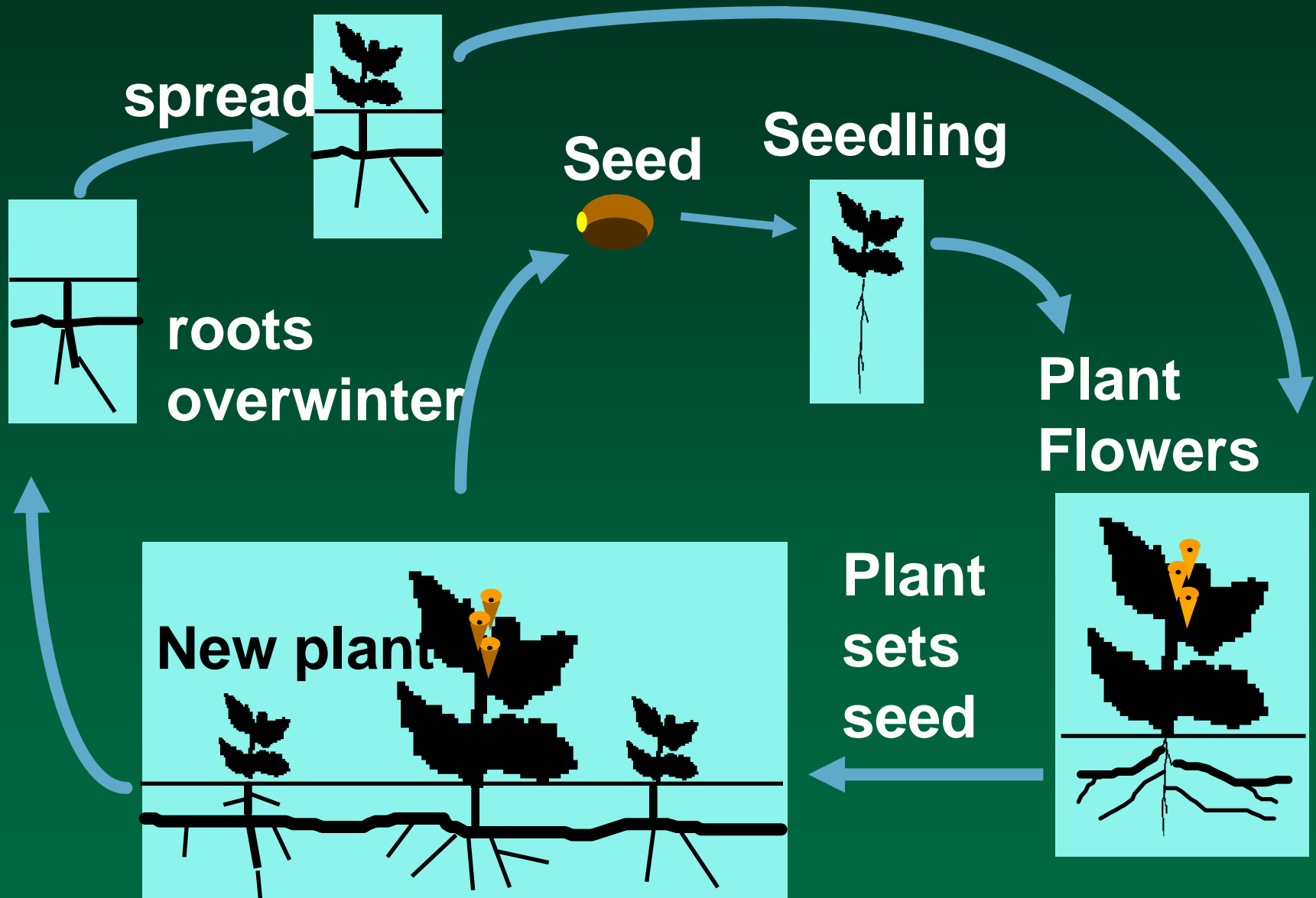
Vegetative
growth



Plant
Over-winters



Life cycle of a perennial weed



Timing PRE Applications

- Summer annual weeds – late winter
- Winter annual weeds – late summer

Herbicide residual – most PRE's last 8 to 12 weeks (some 16)

- Preemergence herbicides stay in the soil preventing weed growth
- Over time herbicides are degraded by microorganisms
- Reapplication is required when the herbicide concentration is below that required to control the target weeds

PRE Herbicides for Landscapes

- Many PRE's for grasses and small seeded broadleaf weeds
- Fewer for broadleaf weeds
- Broadleaf herbicides are generally more injurious to ornamentals



Common PRE herbicides

- Dinitroanilines

- Others

- Pennant Magnum

- Devrinol

- Ronstar

- Dacthal

- Gallery

- Snapshot

Dinitroaniline herbicides

- Good combination of safety and efficacy
- Control SA & WA grasses & some broadleaves, henbit, chickweed spurge.
- Efficacy varies on some broadleaves including ragweed, groundsel, & others.
- Weak on nightshades, galinsoga, purslane
- Do not control nutsedges or other perennials

Dinitroaniline herbicides

Trifluralin	Treflan or Preen	GR only
Pendimethalin	Pendulum, Corral	GR or spray
Prodiamine	Barricade, Regalkade*	GR* or Spray
Oryzalin	Surflan, XL*	GR* or Spray
Benefin + trifluralin	Team Pro	GR

Also ingredients in most other combination herbicides:
Jewel, Snapshot, Freehand, Rout, and others

Surflan (oryzalin)

- Preemergence grass and broadleaf weed control
- 3 to 4 months residual control
- Safe on most woody ornamentals
- Injures many herbaceous perennials and bedding plants

Granular Oryzalin

- XL: benefin + oryzalin
- Surflan Coated Granules
- Preemergence grass and broadleaf weed control
- 3 to 4 months residual control
- Safe on most woody ornamentals and some herbaceous

Barricade (Prodiamine)

- Preemergence control of annual grasses and some broadleaves in woody and herbaceous ornamentals
- Rec. rate: 2.3 lb per acre or 0.84 oz per 1000 sq. ft.
- Strengths: annual grasses, spurge, oxalis. Weak on bittercress, ragweed, morningglory & groundsel

Regalkade 0.5G

- ai: prodiamine 0.5% (same as Barricade)
- preemergence control of annual grasses and some broadleaves
- Rec. rate: 150 to 300 lb / A
- strengths: annual grass control, spurge
- weak on bittercress and groundsel
- Granular formulation much safer on herbaceous perennials than the spray

Pendulum or Corral (pendimethalin)

- Preemergence control of annual grasses and some broadleaf weeds
- GR formulations safer on herbaceous ornamentals (except shasta daisy)
- Weak on groundsel & ragweed

Treflan or Preen (trifluralin)

- Preemergence control of annual grasses and few broadleaf weeds
- Safest herbicide on herbaceous ornamentals
- Weak on groundsel, ragweed, morningglory & other broadleaves

Balan and Team-Pro

- Balan for turf only
- Team Pro (Balan + Treflan) is labeled for use in landscape beds. Not widely used.

How do dinitroanilines differ?

1. Annual broadleaf weed control

- Surflan is generally better
- On spurge – Barricade is slightly better
- On horseweed – Pendulum is better
- Treflan is the weakest

How do dinitroanilines differ?

2. Safety on ornamentals

- Granules are safer than sprays
- Treflan / Preen is the safest on woody and herbaceous
- Pendulum GR and Regalkade G are safe on many herbaceous
- Surflan is generally most injurious (particularly herbaceous)

Other modes of action

- Pennant Magnum – preemergence control of yellow nutsedge (and annual grasses).
- Devrinol – safe on woody and herbaceous but weak on broadleaf weeds

PRE Yellow Nutsedge control: Pennant Magnum 7.6 EC (s-metolachlor) OR Tower 6EC (dimethenamid-p)

- Apply before ornamentals break bud (to avoid foliar injury)
- Relatively short residual (~2 - 3 months)
- PRE control of annual grasses, yellow nutsedge and some broadleaf weeds
- Do not control purple nutsedge

EC herbicide injury to tender spring growth



Tower injury 1 WAT



Pennant Magnum injury 1 WAT

Freehand 1.75G (dimethenamid-p + pendimethalin)

- Preemergence control of annual grasses and small seeded broadleaf weeds
- Suppression of yellow nutsedge
- Safe on most woody ornamentals.
- Herbaceous plants ???



Freehand – weeds controlled



Pennant Magnum vs. Freehand

- EC Form.
- Yellow nutsedge suppr.
- Ann. Grasses
- Few broadleaf weeds controlled
- Well known plant safety
- GR Form.
- Yellow nutsedge suppr.
- Ann. Grasses
- Better on broadleaf weeds
- We are still learning about plant safety

Other modes of action -- Gallery

- PRE broadleaf weed control
- Not grasses
- Safe on woody ornamentals, injures many herbaceous
- Typically used in GR formulation with Treflan = Snapshot TG

Snapshot TG = Preen Pro

- ai: isoxaben 0.5% + trifluralin 2%
- preemergence control of annual grasses and broadleaves
- Rec. rate: 100 to 200 lb / A
- broad spectrum preemergence weed control; less burn than OH2, Rout, Ronstar or Regal OO
- Weak on bittercress & phyllanthus

Other Modes of action -- Ronstar

- Better on annual broadleaf weeds than dinitroanilines
- More expensive and injurious to herbaceous ornamentals.
- Weak on spurge and chickweed

DO NOT USE Princep or Atrazine in landscape beds

- Many ornamentals are injured from root uptake of these herbicides
- If using in the turf, keep away from landscape beds
- Shade trees in treated lawns will typically be OK

How to choose a PRE herbicide

1. Ornamental Plant Safety
2. Efficacy on the target weeds
3. Weeds not controlled
4. Preferred formulation (GR vs Spray)
5. Economics
6. Proximity of susceptible species
7. Environmental issues

Two approaches to Landscape weed management

- KISS – Keep It Simple S.....
- Optimized
 - Choose the most effective options for the site

Simple (KISS) Approach:

- Mulch
- Treflan / Preen
- Hand weed and spot spray escapes

Optimized Approach

- Mulch
- Select broadest spectrum herbicide for the site
 - Woody beds
 - Herbaceous perennial beds
 - Bedding plants

Comparison of PRE Herbicides

Herbicide	Crab-grass	Bitter-cress	Horse weed	Groun dsel	Oxalis	Nut-sedge
Surflan	G	G	F	G	G	P
Barricade	G	F	F	F	G	P
Pendulum	G	F	G	P	G	P
Treflan	G	F	F	P	F	P
Devrinol	G	F	P-F	P-F	P	P
Pennant	G	F	P	P	F	G
XL	G	F	F	F	G	P

Comparison of PRE Herbicides

Herbicide	Crab-grass	Bitter-cress	Horse weed	Groun dsel.	Oxalis	Nut-sedge
Snapshot	G	G	G	G	G	P
Freehand	G	F	G	F	G	F
Gallery	P	G	G	G	G	P
Princep	P	G	G	G	G	P
Rout	G	G	G	G	G	P
Ronstar	F	G	F	P	G	P

Woody Ornamentals

- Tolerant of broad spectrum herbicides such as Snapshot, Gallery, Ronstar, Rout, Regal OO etc.
- Select herbicide for safety on ornamentals and weeds controlled

Regal OO

- ai: oxyfluorfen 2% + oxadiazon 1%
- preemergence control of annual grasses and broadleaves
- Rec. rate: 100 lb / A
- broad spectrum preemergence weed control
- weak on crabgrass; burns like OH2 & Rout

Rout

- ai: oxyfluorfen 2% + oryzalin 1%
- preemergence control of annual grasses and broadleaves
- Rec. rate: 100 lb / A
- broad spectrum preemergence weed control
- burns tender foliage -- do not use on herbaceous plants

Bedding Plants

- Tolerance to herbicides varies among species
- Check labels and Extension recommendations
- Hort Info Leaflet #644



<http://www.ces.ncsu.edu/depts/hort/hil/>

PRE herbicides for summer bedding plants

	Pen- nant	Barric ade	Pendu- lum	Surf- lan	Tref- lan	XL
Ageratum	R		R		R	
Begonia			R	X		X
Lantana	R		R			
Melampod						
Salvia			R	R	R	R
Vinca			R	X	R	

Source: HIL 644 -- Weed management in annual color beds

Herbaceous Perennials

- Few herbicides registered
- Herbicide tolerance varies among species
- In diverse plantings -- the simple approach is generally the safest

PRE herbicides for herbaceous perennials

	Pen- nant	Barri- cade	Pendu- lum	Surf- lan	Tref- lan	XL
Astilbe						
Daylily	R		R	R		R
Hosta	R		R	R		R
Heuchera						
Speedwell	R				R	
Verbena			R		R	

Source: HIL 644 -- Weed management in annual color beds

Where to get more information?

- Cooperative Extension
- AG-427
- HIL 644
- Trade journals and your peers

How to use the resources

- Weed Control Suggestions In Christmas Trees, Woody Ornamentals and Flowers - AG-427
- NC Extension publication \$7.50 ea.

AG-427 Includes:

- General weed biology
- Calibration
- Herbicide information
 - Weeds controlled & Not controlled
 - Recommended uses and doses
- Tables of weed susceptibility
- Tables of ornamental safety

How to use AG-427

- Table 1 for efficacy
- Tables 3 (woody) and 5 (for herbaceous) safety
- Cross reference between tables

Example:

- What preemergence herbicide would you use to control bittercress in pansy beds?

Step 1: what herbicides are safe on pansies?

Table 5. Preemergence herbicide registrations on herbaceous ornamentals

Species	Barricade	Gallery	Pendulum	Pennant	Surflan	Treflan	XL
Astilbe							
Dahlia			R			R	
Marigold			R*	I	R	R	R
Pansy			I	R	I		R

R= registered, I = injury has been observed

Step 2: which of these herbicides controls bittercress best?

Table 1. Preemergence herbicide efficacy on annual weeds

Species	Barricade	Gallery	Pendulum	Pennant	Surflan	Treflan	XL
Bittercress	F	G	F	P	G	P	F
Chickweed	G	G	G	F	G	G	G
Crabgrass	G	P	G	G	G	G	G
Henbit	G	G	G	F	G	G	G

Example:

- What preemergence herbicide would you use to control bittercress in pansy beds?
- XL is the best alternative

Study Questions

- How do preemergence herbicides control weeds?
- When should a preemergence herbicide be applied? And, how does this relate to a weed's life cycle? Specific examples.
- Why are dinitroaniline herbicides the most commonly used herbicides in landscape plantings?
- Give 4 examples of dinitroaniline herbicides labeled for use in landscape beds. List the strengths and weaknesses of each.

Study Questions

- What publication is the most appropriate source for information on herbicides for use in ornamental plantings?
- Given the species of weeds and ornamental plants – be sure you know how to use the tables from that publication to develop a herbicide recommendation.
- Which would be safer on herbaceous ornamentals? And Why? Surflan vs XL; Penulum 2G vs Treflan 5G; Barricade vs. Regakade; Gallery vs. SnapshotTG?
- You need to control mostly broadleaf weeds in a woody landscape bed. Which herbicide(s) have the greatest likelihood of controlling those weeds -- Gallery, Surflan, Ronstar, Snapshot TG, or Treflan? Explain your answer (s). How would your answer change for annual bedding plants?