Basic Plant Biology and Identification Principles

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What is a weed?

- A plant out of place?
- Any plant that is objectionable or interferes with the activities or welfare of man (WSSA)
    - Often objectionable because they interfere

Weed Management Tools

- What is the overall goal?
  - Keep weeds ‘off balance’
    - Provide least ideal environment for weeds, more ideal environment for desired plants
- How do I achieve successful control?
  - Early bird catches the worm…or in this case, the weed!
    - The younger the plant the ‘easier’ the control
    - Young plants haven’t developed structures that make weed development and growth successful
  - Develop weed management strategy

Developing weed management strategy

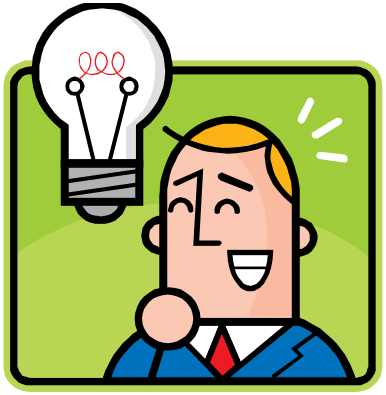
- Determine the specific objectives of your area
- Identifying weed and desirable plant species
- Management
  - Knowledge of tools available to you
- Evaluation of control methods
  - Impacts
  - Success
    - Integrated Weed Management

Integrated weed management (IWM)

- Multiple control options available
  - No single weed control option will be successful!
- Combinations of good management practices are required for effective control
- Strategies should be specific to target weed
  - **Accurate identification**

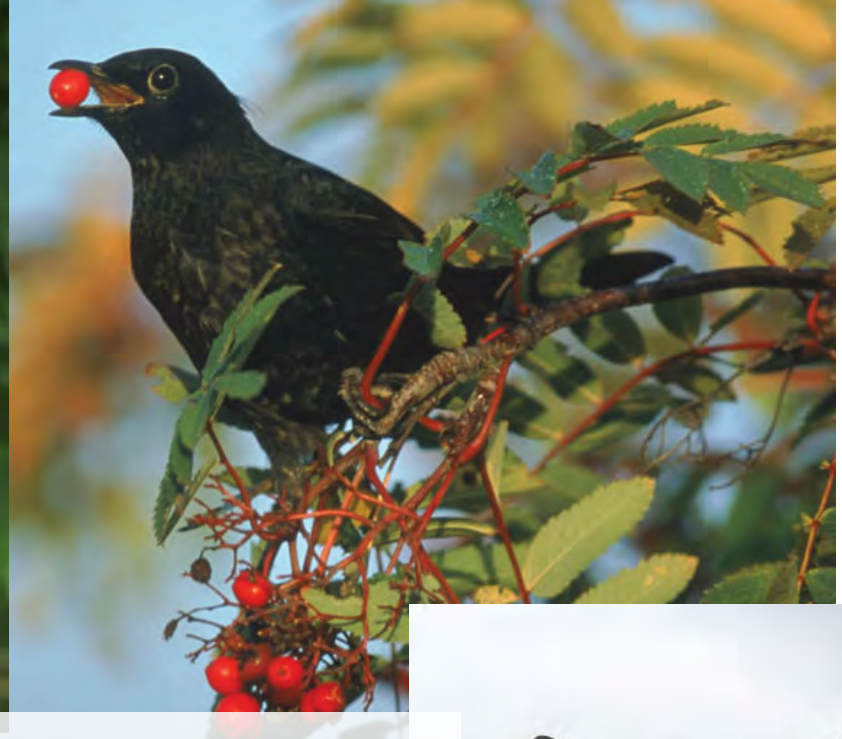
Why identify?

- Annuals vs. Perennials
  - Pre vs. Post control options vary
- Variation in response to management
  - Select the right tool for success
- Life cycle, flowering, seed production
  - Timing of management is essential
- Impress your friends and neighbors



Why are weeds successful?

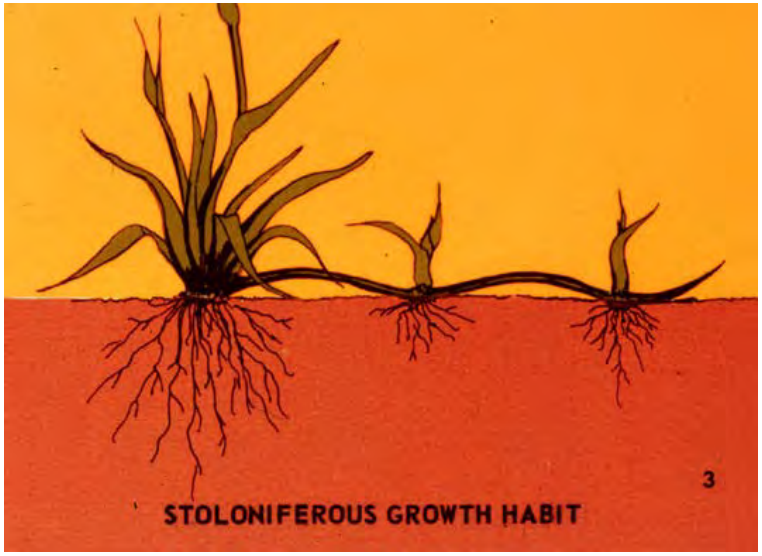
- Rapid colonization of disturbed areas
- Very rapid growth
- Self compatible
- Very high seed production
- Seed dormancy
- Vegetative reproductive structures
- Seed dispersal mechanisms

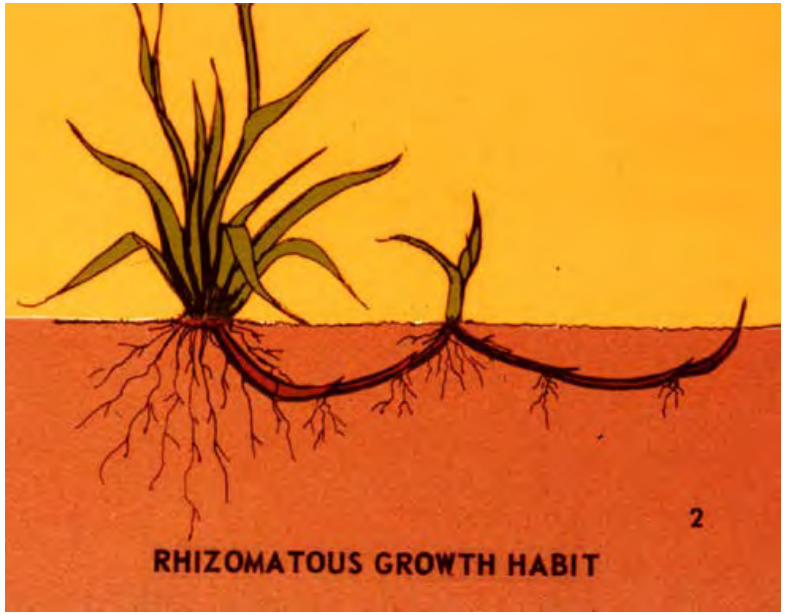


Seed dispersal mechanisms

Vegetative Reproductive Structures

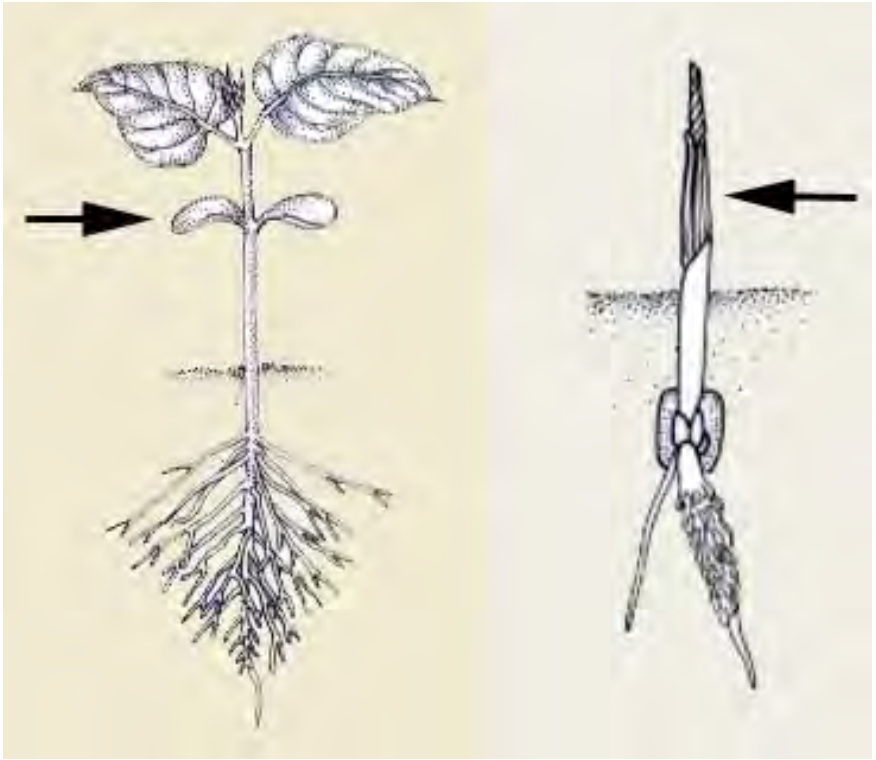
- Bulbs/tubers
- Tillers
- Creeping stems
  - Rhizomes
  - Stolons





Weed classification:

- Weeds are divided into three major classes:
  - Broadleaves (Dicots)
  - Grasses (Monocots)
  - Sedges (Monocots)

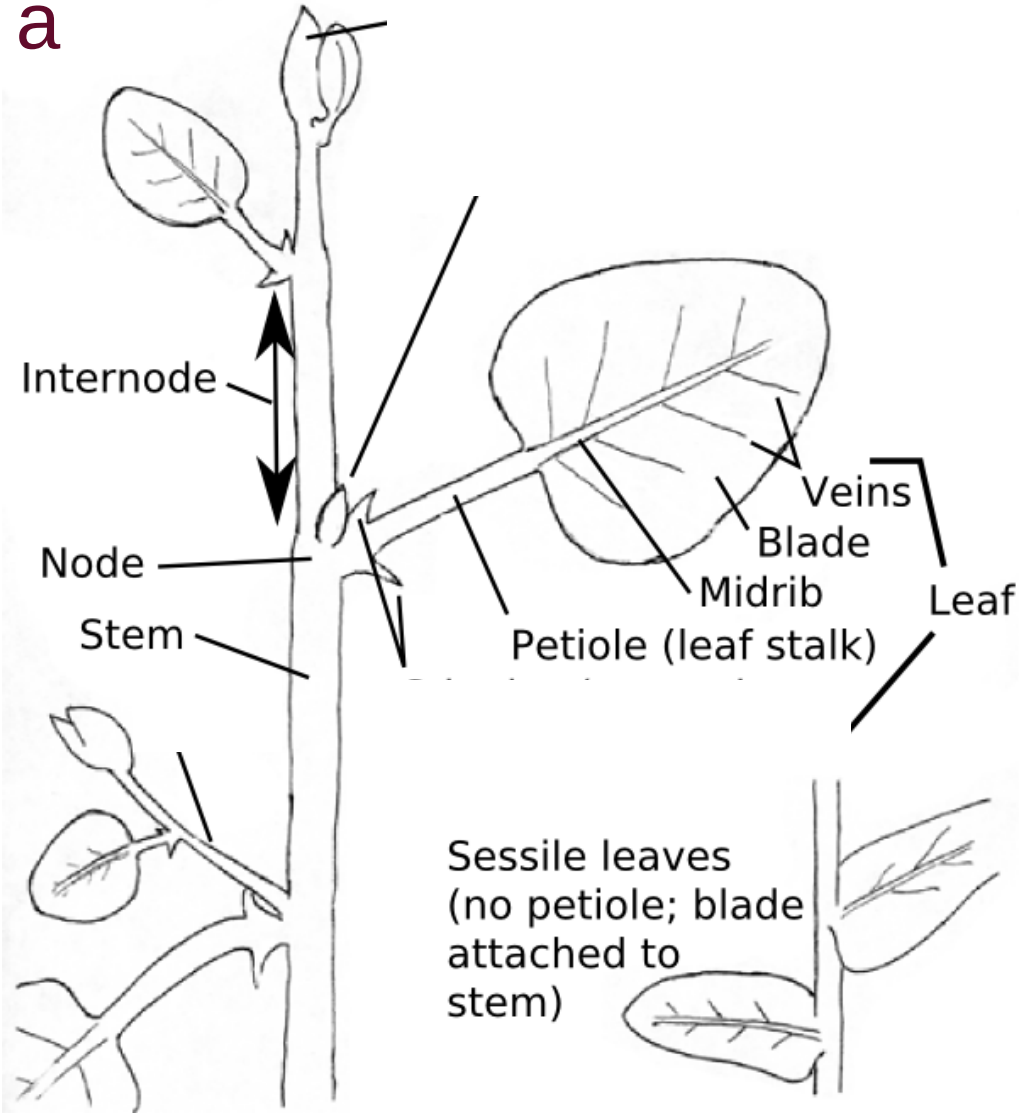


Broadleaf identification:

- Dicot
- Key characteristics
  - Two cotyledons
    - Seedling leaves
    - First to emerge
    - In many cases do not resemble the mature leaf
  - leaf blade with can range from broad to slightly narrow
    - Mostly broad
  - Leaf veins netted
  - Taproot

Broadleaf identification:

- Key structures on a broadleaf weed
  - Node
  - Internode
  - Leaf stems
    - Petiole
    - Sessile
  - Leaf features
    - Shape
    - Veins
    - Edges (margin)



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Broadleaf identification: Leaf margin

- Entire
  - Smooth
- Undulate
  - Rounded ‘bumps’
- Serrate
  - Toothed
- Lobed
  - Deep or shallow ‘indentions’

Common purslane

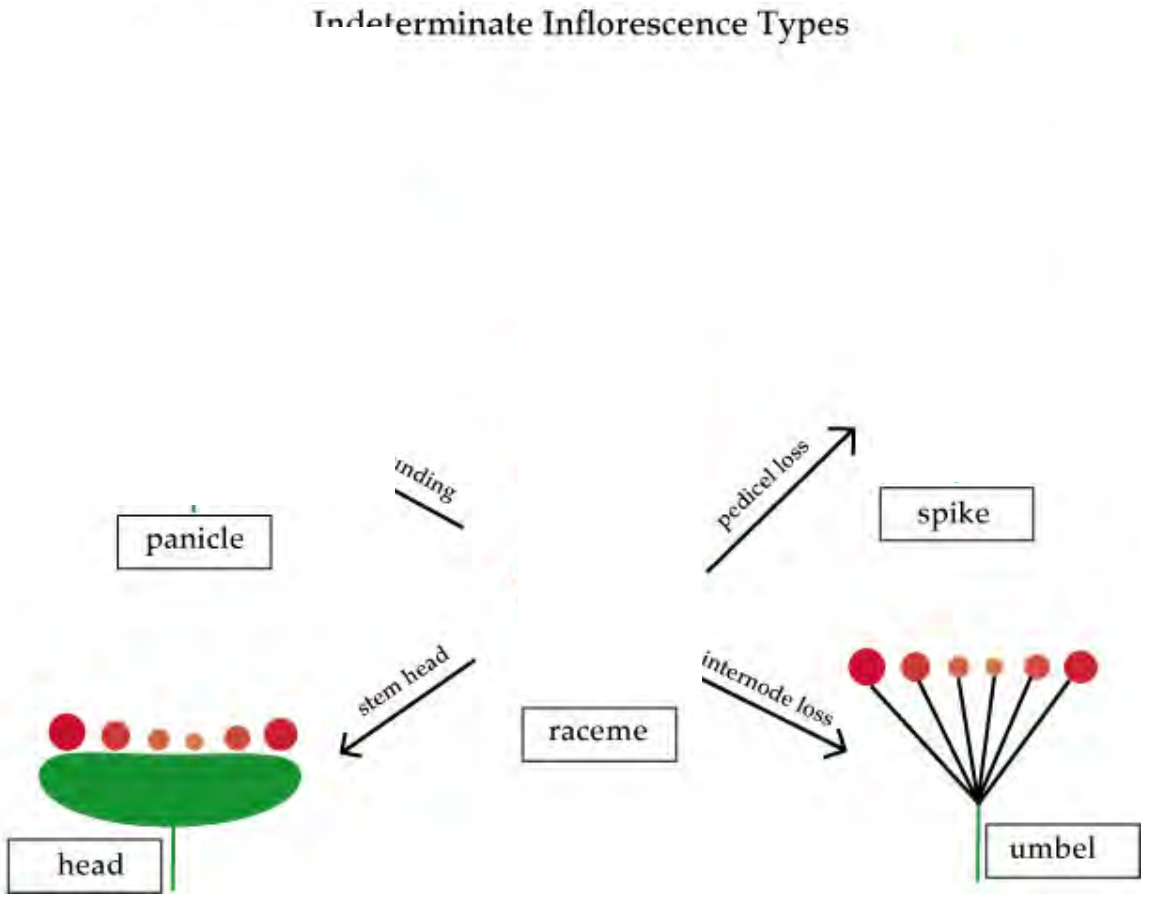
Purple deadnettle

Dandelion

Common mallow

Broadleaf identification: Inflorescence

- How the flowers are arranged on the stem
  - Spike
  - Raceme
  - Panicle
- Can also be used to identify grasses



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Grass identification:

- Monocot
- Notoriously difficult to id
  - Especially young/seedling stage
- Key characteristics
  - One cotyledon
  - Narrow leaf blade
  - Leaf veins run parallel
  - Fibrous root system

Grass identification: Vernation

- Folded
- Rolled

Goosegrass

Crabgrass

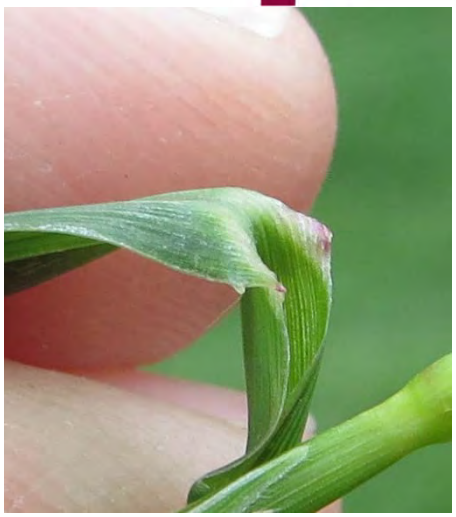
Goosegrass

Crabgrass

Grass identification: Ligule

- Collar
  - Found at junction between leaf blade and stem sheath
    - Essential ID characteristic
      - Absence of seedhead
  - Ligule (found at the back of the collar)
    - Membranous
    - Hairy
    - Absent

Zoysiagrass



Barnyardgrass

Cheatgrass

Grass identification: Other Traits

- Auricles
  - Clasping
  - Short
  - Absent
- Leaf tips
  - Pointed vs. rounded
  - Boat-shaped
- Growth habit
  - Bunch-type
  - Spreading

Quackgrass

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Sedge identification:

- Monocot
- Leaves similar to grasses
  - Long, narrow, smooth
  - Arranged in threes
  - Waxy/shiny
- Solid, triangular stems
  - Reproduce by seeds, tubers, rhizomes

Weed ID is essential for effective weed management

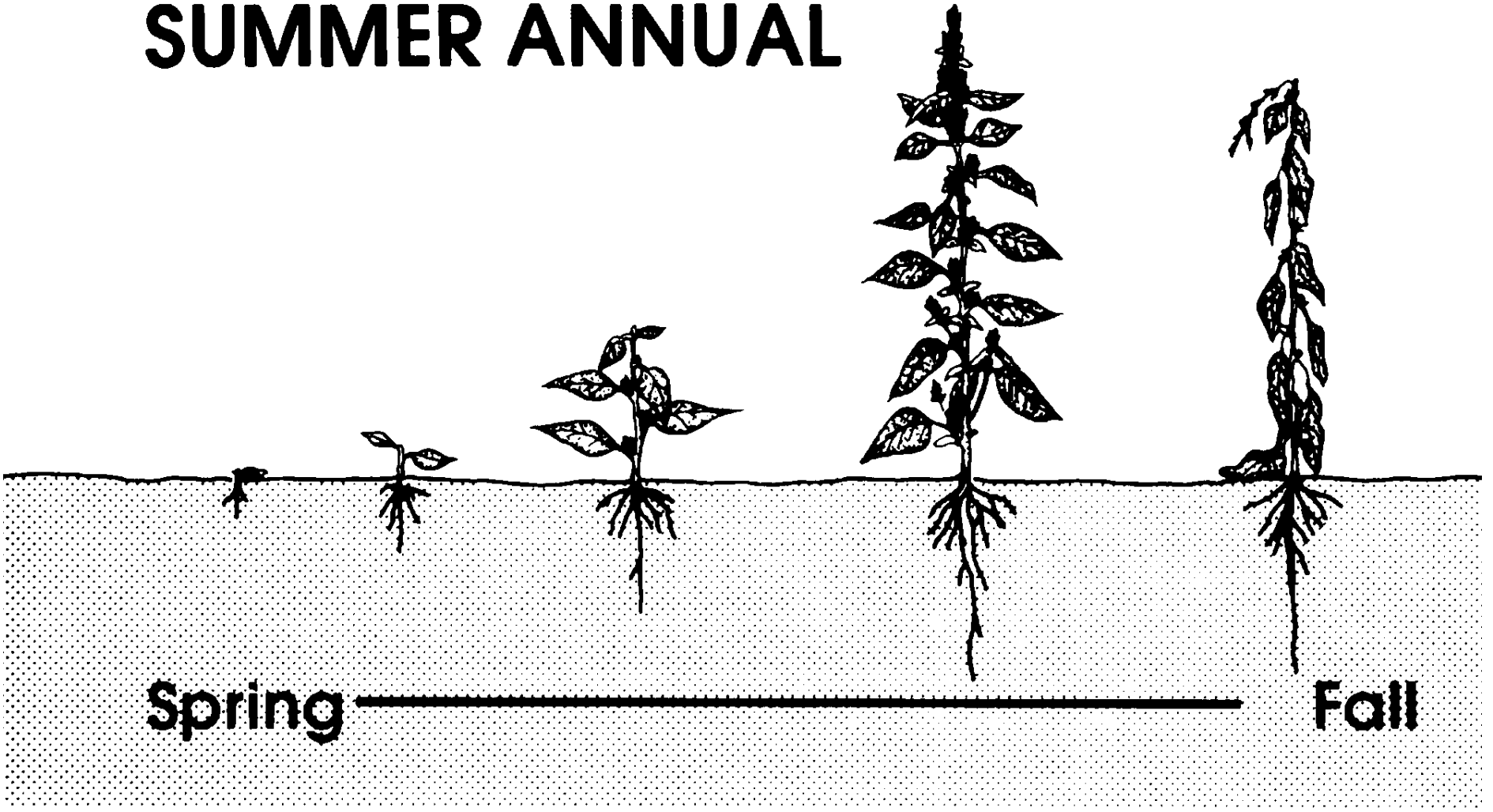
Weeds are categorized into one of four lifecycles

1. Summer annuals
   - Summer annuals germinate in the spring when soil temperatures reach about 55-65ºF, flower in the summer and die in the fall at first frost
2. Winter annuals
   - Winter annuals germinate in the fall (55-65ºF), grow until spring and die during late spring or early summer
3. Biennials
   - Life cycle lasts two years. Few examples
4. Perennials
   - Perennial weeds are capable of living more than two years

Optimum control timings depends on weed lifecycle

- Winter annuals
  - Sept. – Nov. optimum control window
  - Should I apply a herbicide in the spring?
- Summer annuals
  - When at seedling stage (May-June)
- Biennials
  - When in first growing season (rosette stage)
    - Only reproduces by seed
- Perennials
  - Fall management works best!
  - Late Sept. through mid-Nov. is best
    - Depending on temperatures
  - Second best timing is mid-March through May

SUMMER ANNUAL

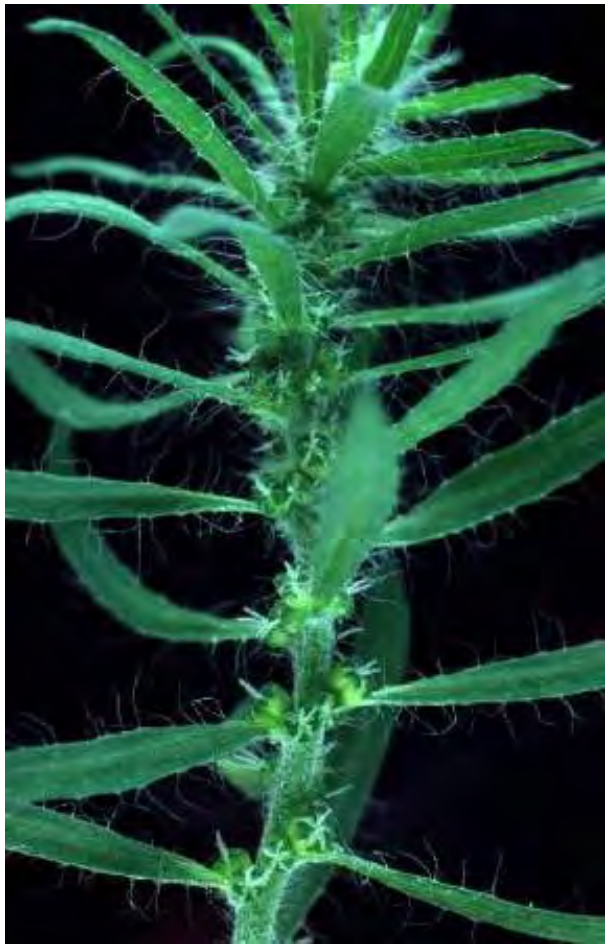


Summer annuals include:

- Kochia
- Palmer amaranth

Kochia (*Kochia scoparia*)

- Identifying features:



Leaves long, narrow

No leaf stems (petioles)

Dull green in color

Covered in soft, fine hairs

Seeds in clusters

Can produce 14,600 seeds per plant

Becomes a tumbleweed when mature

Palmer amaranth (Amaranthus palmeri)

- Identifying features:

Most aggressive pigweed

One central stem with lateral, bushy branches

Oval, rounded leaves

Young plant leaves have 'notch' at the apex, become more pointed with maturity

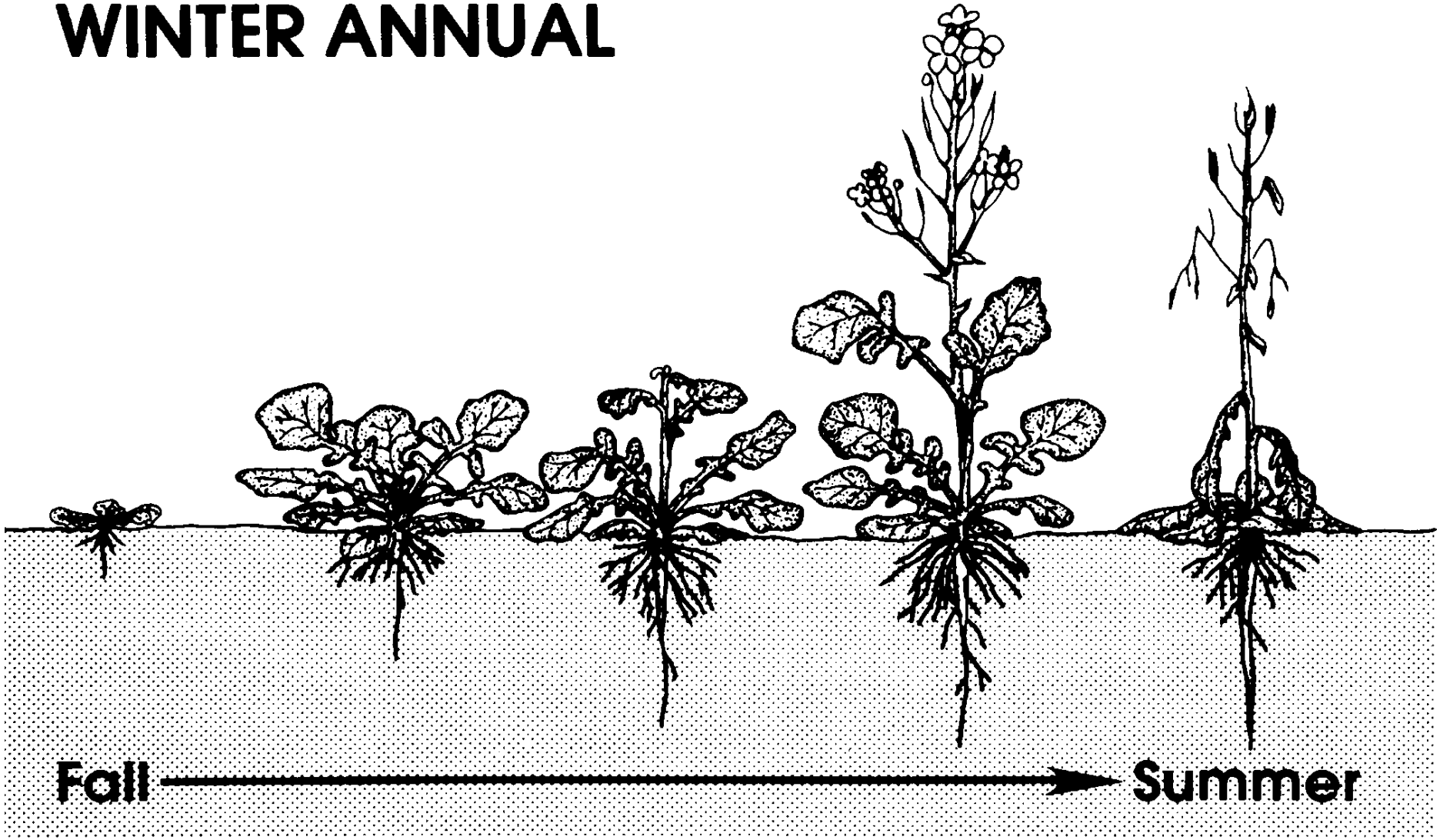
Petioles often longer than the leaf

Leaves arranged in wheel-spoke pattern

Single plant can produce 600,000 seed

Females have long seedhead (up to 3 ft)

WINTER ANNUAL



Winter annuals include:

- Cheatgrass
- Malta starthistle

Cheatgrass (*Bromus techtorum*)

- Identifying features:

Aka: downy brome

All leaves and stems covered in soft, dense hair

Papery thin, ragged edged ligule

Inflorescence is dense, slender, and usually drooping

Can produce 300 seed per plant or more

Seed has awns that can be 3/8 to 5/8” long

Awns can turn purplish at maturity

Malta starthistle (*Centaurea melitensis*)

- Identifying features:

Looks very similar to yellow starthistle

Start as a basal rosette

Grayish-green leaves with stiff hairs

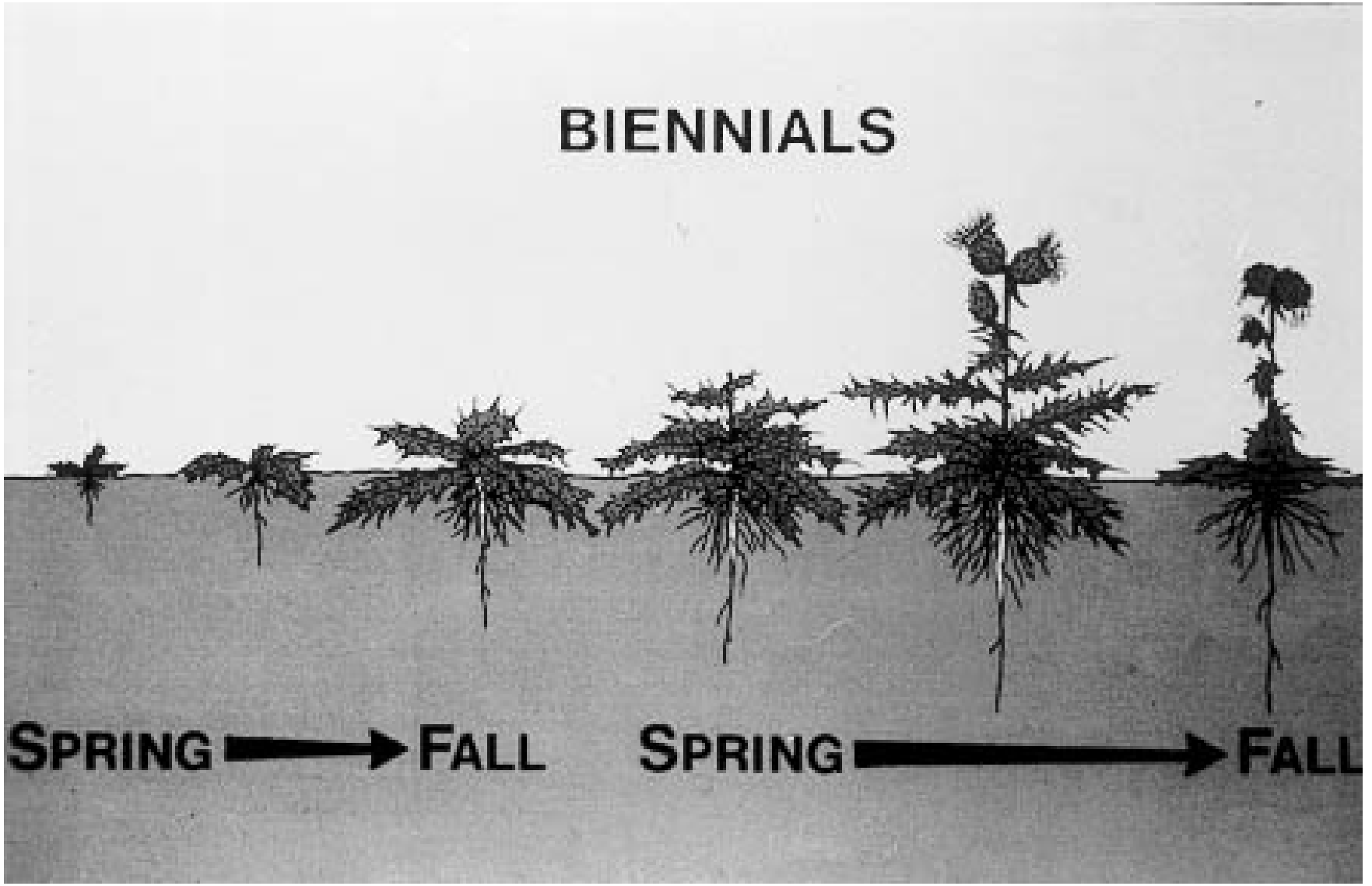
Leaves attach to stems to form ‘wings’

Flowers appear slightly earlier (June) than yellow starthistle

Yellow flowers

flowers and spines smaller than yellow

Flower spines are slender and purple-brownish tinged


BIENNIALS
SPRING
FALL
SPRING
FALL

Biennial weeds include:

- Musk thistle
- Bull thistle

Musk thistle (*Carduus nutans*)

- Identifying features:

Grows from a basal rosette

Both leaves and stems have sharp spines

Leaf margins are deeply lobed with white tinge

Leaves dark green with light green midrib

Leaf bases extend down to stem, creating spiny wings

Long hairs only along main leaf veins

Bright pink/purple flowers atop long erect stalks

Spines on flowers as well

Bull thistle (*Cirsium vulgare*)

- Identifying features:

Grows from a basal rosette

Both leaves and stems have sharp spines

Spines much more pronounced than musk thistle

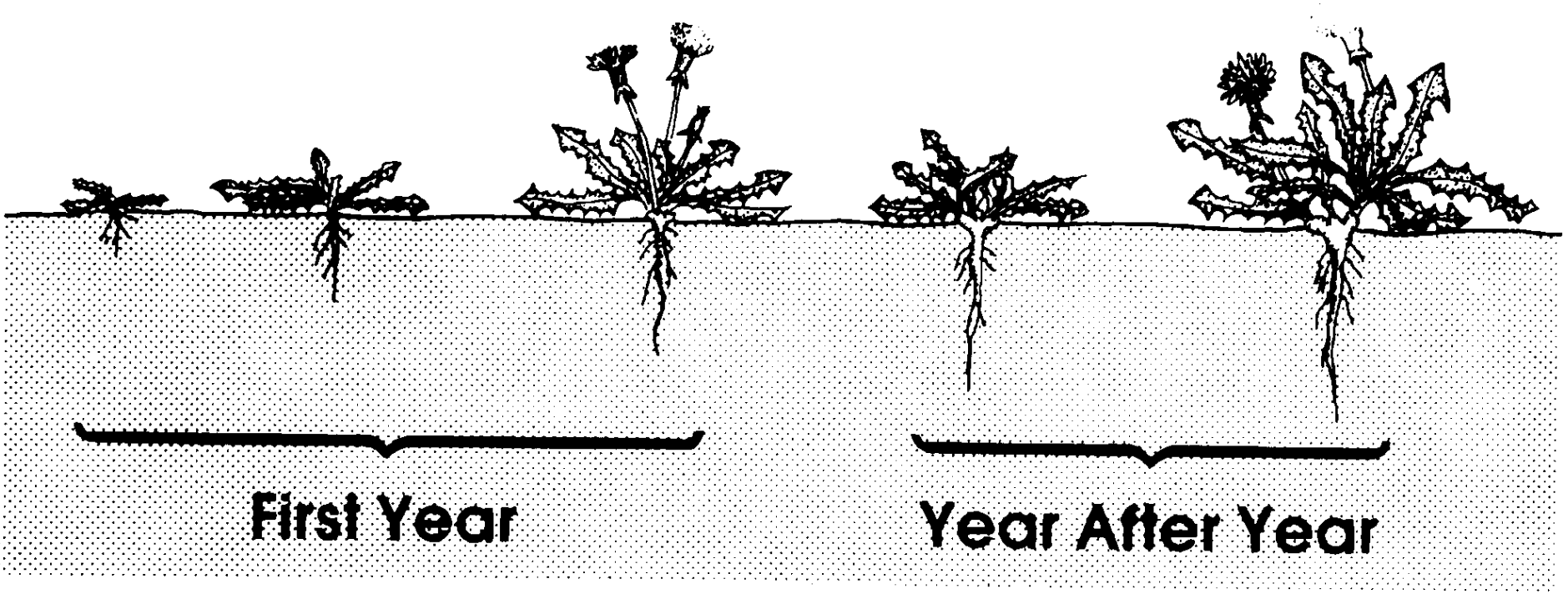
Leaf margins deeply lobed

Leaves prickly and hairy on upper surface, cottony underneath

Flowers clustered at the ends of branches on erect stalks

Bright pink/purple flowers with spiny bracts

PERENNIAL



Perennial weeds include:

- Russian knapweed
- Saltcedar

Russian knapweed (*Acroptilon repens*)

- Identifying features:

Grows from a basal rosette

Newly emerged/lower leaves are toothed and covered in fine hairs

Upper stem leaves smaller with toothed or entire margins

Leaves are bluish-green in color

Spreads via aggressive rhizomes

Pink/purple flowers

Outer bracts under flower heads have broad, papery tips

Saltcedar (*Tamarix ramosissima*)

- Identifying features:

Can be deciduous or evergreen

Bark on saplings and stems is reddish-brown

Leaves small and scale-like

Leaves are on slender branched stems

Small pink flowers borne in finger-like clusters

Saltcedar leaf beetles current hot topic in biocontrol in NM

Can transpire up to 100 gallons of water a day (can dry up ponds and streams)

Salt cedar damage

After one month…

Don’t be afraid to ask for help


Questions?