Introduction to Weed Science and Weed Identification

Definition of a Weed

- A plant growing where it is not wanted (*Oxford Dictionary*)
- Any plant or vegetation, excluding fungi, interfering with the objectives or requirements of people (*European Weed Science Society*)
- A plant that is especially successful at colonizing and proliferating in disturbed sites

First Steps in Weed Management

- To effectively manage weeds you should know:
  - What weed you are dealing with – correct identification
  - Consider impact of the weed
  - Life cycle of the weed
- Weed biology influences methods and optimum time for management strategies

Weed Classification

- Morphology
  - Structure and form
- Life cycle
  - How it develops


Yellow foxtail


Ground ivy


Yellow nutsedge

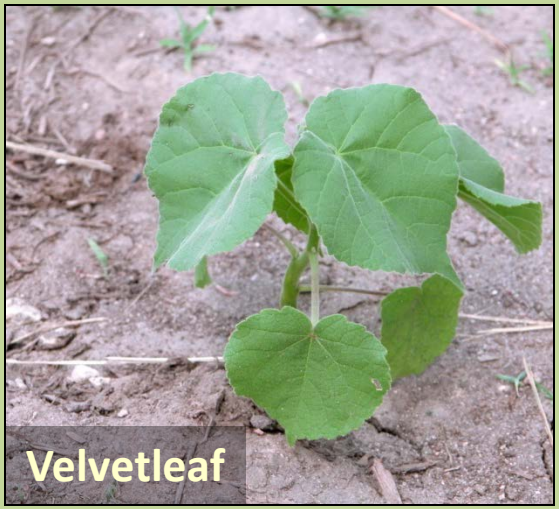
Weed Classification – Morphology

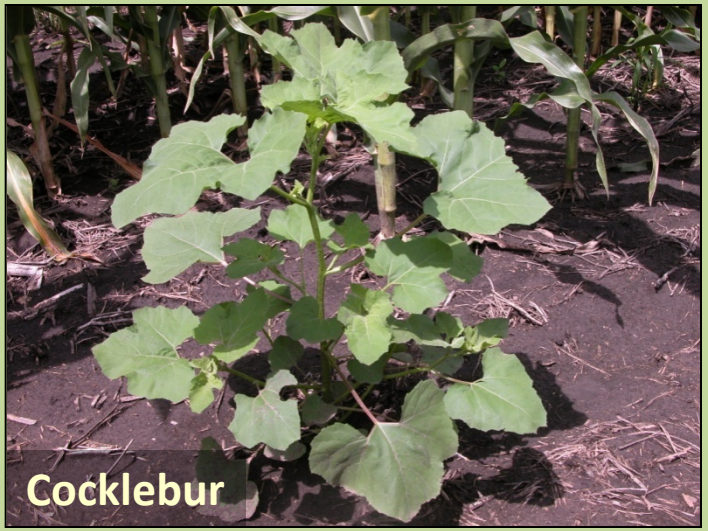
- Monocotyledon – one cotyledon or one embryonic leaf
  - Grasses, sedges, rushes

- Dicotyledon - two cotyledons
  - “Broadleaf” plants

Weed Classification – Life Cycle

- Annuals
  - Complete their life cycle from seed to seed in less than 12 months



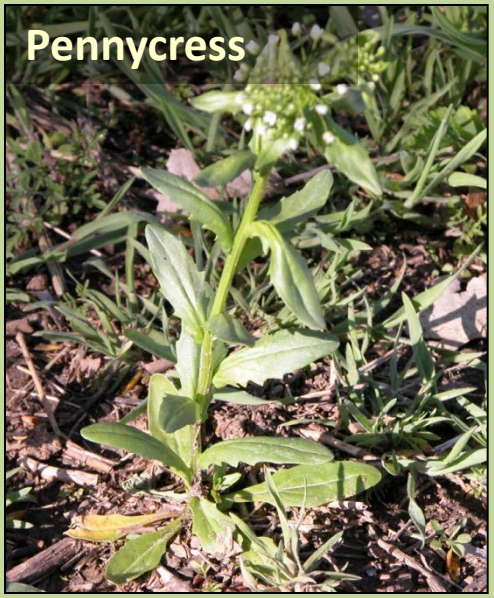


Summer Annuals

- Seeds germinate in spring
- Flower in mid to late summer
- Produce seed in late summer or fall, then die
- Similar growing season to corn and soybean
- E.g., lambsquarters, foxtails, crabgrass, purslane, waterhemp

Winter Annuals

- Germinate in late summer or fall
- Dormant over winter
- Flower and produce seed in mid to late spring
- Die in summer
- E.g., shepherd's purse, chickweed, pennycress, speedwells



Biennials

- Complete life cycle in <u>two</u> years
- Germinate and form basal rosette first year, remain vegetative and store food for winter


Musk thistle


Wild carrot


Wild parsnip

Biennials

- Flower, produce seed, and die during second growing season
- Need undisturbed soil for at least two years
- E.g., musk thistle, wild carrot, wild parsnip, garlic mustard


Musk thistle


Wild carrot


Wild parsnip

Perennials (herbaceous)

- Live for more than two years
  - Simple: produce a taproot, spread only by seed
    - E.g., Dandelion, broadleaf plantain
  - Creeping: can reproduce by buds, rhizomes, tubers, bulbs, and seed
    - E.g., Quackgrass, nutsedge, leafy spurge

Weed ID - Sources of Information

- ISU Weed Identification Field Guide
- Reference books
- Extension bulletins
- Many websites
  - http://www.wssa.net/Weeds/ID/Photo Gallery.htm
  - http://plants.usda.gov/
- Someone “in the know”
  - Local experts
  - Extension offices

What Makes a Weed Successful?

- Seed characteristics
- Ability to germinate and grow in many environments
- Rapid seedling growth
- Self-compatibility or easy cross-pollination
- Vigorous vegetative reproduction
- Ability to tolerate environmental stresses


Prostrate spurge


Canada thistle

Seed Characteristics

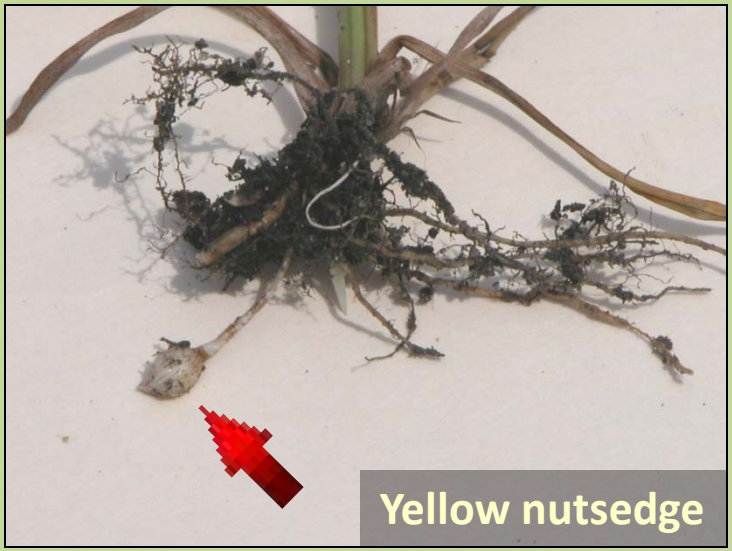
- Longevity of seed
- Long period of seed production
- High seed output
- Ability to produce seed in adverse conditions
- Long and short seed dispersal

Vegetative Reproduction

- Rhizomes
  - Underground structures that produce new plants
    - E.g., canada thistle, quackgrass
- Stolons
  - Above-ground creeping stems that root at nodes and produce new plants
    - E.g., ground ivy (creeping charlie)

Vegetative Reproduction

- Bulbs, bulblets, tubers
  - Underground leaf tissue modified for food storage. Produces new plants
    - E.g., wild garlic, yellow nutsedge
  - Aerial bulblets (above ground)
    - E.g., wild onion, wild garlic



Vegetative Reproduction

- Plant reproduction
  - Each plant part can regenerate another plant
  - When cultivating, the implement can redistribute them in the field
    - E.g., Asiatic dayflower, purslane


Asiatic dayflower


Purslane

Dispersal

- Wind
- Attachment – burs, thorns, stickers
- Birds – digestion/excretion
- Artificial dispersal – “human dispersal”
  - Soil and compost
  - Equipment
  - Plants
  - Contaminated seed

Weed Management Strategies


Canada thistle


Velvetleaf


Poison ivy


Yellow nutsedge

Summary

- Identify the weed
- Know the life cycle
- Use control strategies based on weed species, life cycle, crop, field or landscape situation, and the environment