Weed ID & Ecology

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CFAES

What is a weed?

- A plant out of place
- A plant that interferes with any human activity
- A plant whose virtues have not yet been discovered (*Ralph Waldo Emerson*)

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Weeds are everywhere!

3

CFAES

What makes a weed, a weed?

- Defining biological characteristics
  - Interference
  - Persistence
  - Capacity
  - Destructive or injurious to animals and crops

- Life cycles and plant anatomy

4

CFAES

What makes a weed, a weed?

- Defining biological characteristics
  - **Interference**
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CFAES

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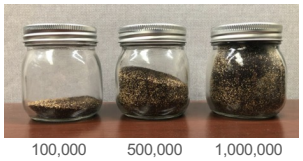

- Life cycles and plant anatomy

6

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  - **Capacity**
  - Destructive or injurious to animals and crops
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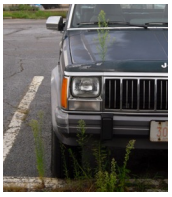

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What makes a weed, a weed?

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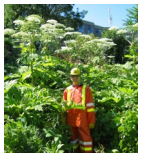
  - **Destructive or injurious to animals and crops**
- Life cycles and plant anatomy



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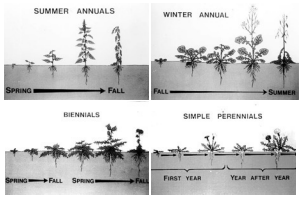

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Summer annuals

- Lives one year
- Life cycle starts in spring and ends in fall

Foxtail

Purslane

Lambsquarters

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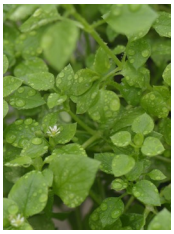
Winter annuals

- Lives one year
- Life cycle starts in fall and ends in spring

Purple deadnettle

Shepherds purse



Common chickweed

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Biennials

- Lives two years
- Vegetative first year, reproductive second year

Common mallow

Wild carrot

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CFAES

Simple perennials

- Live more than two years
- Non-spreading

Dandelion

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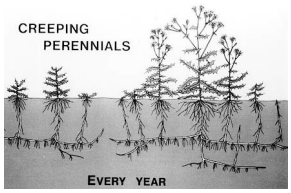
CFAES

Creeping perennials

- Live more than one year
- Spread via vegetative propagules
  - Bulbs
  - Stolons
  - Rhizomes
  - Tubers
  - Creeping roots



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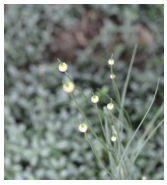
Bulbs

- Modified leaves
- Subterranean and aerial bulbs



Wild garlic

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CFAES

Stolons

- Horizontal aboveground stems

Ground ivy

Lizzieharper.co.uk

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CFAES

Rhizomes

- Horizontal, underground stems

Lizzieharper.co.uk

Japanese knotweed

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CFAES

Tubers

- Shortened rhizomes

Yellow nutsedge

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CFAES

Creeping roots

- Horizontal & vertical roots



Canada thistle

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CFAES

WEED ID

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CFAES

Monocot vs Dicot

Monocots

- Embryo and seedling with one cotyledon
- Leaves usually narrow (longer than wide) with veins parallel to each other
- Flower parts are in threes or multiples of three

Dicot

- Embryo and seedling with two cotyledons
- Leaves usually broad
- Flower Parts usually occur in fours of fives

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CFAES

Monocots

Grasses

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CFAES

Annual bluegrass

Poa annua

- Summer annual
- Linear leaves
- **Membranous long-pointed ligule**
- **Boat-shaped leaf tip**
- Glabrous or hair free

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CFAES

Annual bluegrass

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CFAES

Giant foxtail

Setaria faberi

- Summer annual
- **Dense short hairs cover upper leaf surface**
- Hair on entire leaf sheath margin
- Fringed membranous ligule
- Inflorescence: spike-like panicle

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CFAES

Giant foxtail

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CFAES

Yellow foxtail

Setaria glauca

- Summer annual
- **Long hairs at base of upper leaf surface**
- Flat stem, rolled bud
- Inflorescence: spike-like panicle

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CFAES

Yellow foxtail

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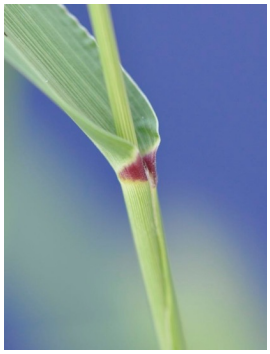
CFAES

Green foxtail

Setaria viridis

- Summer annual
- **Hairs on upper sheath margins only**
- Rough to the touch
- Inflorescence: spike-like panicle



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CFAES

Green foxtail

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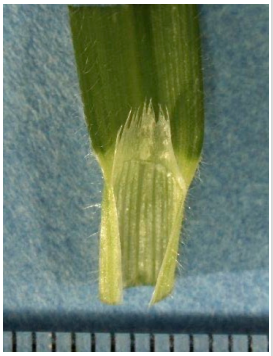
CFAES

Downy brome
Bromus tectorum

- Winter annual
- **Upper and lower side of leaf and sheath densely (velvety) hairy**
- **Tall, notched ligule**
- Sheath closed or united
- Inflorescence: panicle
- Soft to the touch



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CFAES

Downy brome

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CFAES

Large crabgrass
Digitaria sanquinalis

- Summer annual
- **Long hairs at 90° angle on sheath**
- Hair on leaf blade
- Average ligule
- Plant somewhat prostrate
- Rooting at nodes

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CFAES

Large crabgrass

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CFAES

Yellow nutsedge
Cyperus esculentus

- Perennial
- **Triangular stem**
- Yellowish-green leaves
- Tubers (nutlets) on the roots
- Fast growing

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CFAES

Yellow nutsedge

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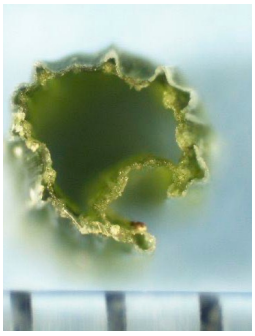
CFAES

Wild garlic
Allium vineale

- Perennial
- **Round hollow leaves**
- **Branch off main stem**
- Bulb with hardshell bulblets, membranous bulb coat
- Garlic odor



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CFAES

Wild garlic

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CFAES

Wild onion
Allium canadense

- Perennial
- **Flat leaves, not hollow**
- **Leaves merge from base of plant**
- White or pink flowers
- Onion-like odor

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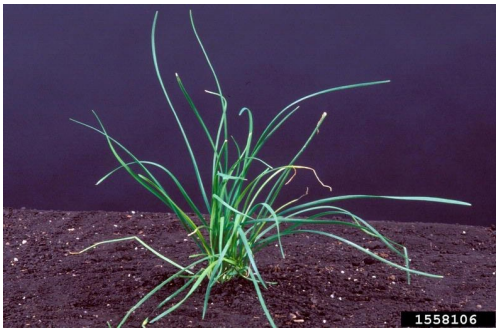
CFAES

Wild onion



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CFAES

Star-of-Bethlehem
Ornithogalum umbellatum

- Perennial
- **Hollow leaves, dark green leaves with distinct white midrib**
- **Star shaped white flower**
- No garlic or onion odor
- Poisonous

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CFAES

Star-of-Bethlehem

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CFAES

Dicots

Broadleaves

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CFAES

Prostrate knotweed

Polygonum aviculare

- Summer annual
- **Ochrea and flowers at nodes**
- **Linear leaves**
- Prostrate growth habit

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CFAES

Prostrate knotweed

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45

CFAES

Curly dock

Rumex crispus

- Simple perennial
- **Leaves with undulating leaf margin** (like a piece of cooked bacon)
- Basal rosette formed first
- Red/purple spots of leaves and stems

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CFAES

Curly dock

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CFAES

Common lambsquarters

Chenopodium album

- Summer annual
- Wedge-shaped lower leaves, oval-shaped leaves later
- Up to first 2 nodes opposite; the rest alternate
- **Pale green leaves with mealy white surface, triangularly toothed**

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CFAES

Common lambsquarters

49

CFAES

Redroot pigweed

Amaranthus retroflexus

- Summer annual
- Red to purplish stems
- Alternate true leaves with notched or pointed apex
- Wide, egg-shaped leaves
- **Hairy stems and petioles**

50

CFAES

Redroot pigweed

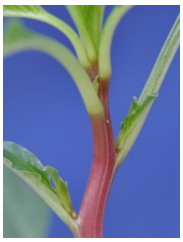
51

CFAES

Waterhemp

Amaranthus tuberculatus/rudis

- Summer annual
- **Hairless stems and petioles**
- **Petiole shorter than leaf**
- Long, narrow leaves with alternate arragement



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CFAES

Waterhemp

53

CFAES

Palmer amaranth

Amaranthus palmeri

- Summer annual
- Stems and leaves hairless and smooth
- Ovate to diamond leaves
- **Petioles long as/longer than the leaves**
- Sharp bracts

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CFAES

Palmer amaranth

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CFAES

Mouseear chickweed

Cerastium vulgatum

- Simple perennial, creeping perennial
- **Hair on leaf blade, stem, and petiole**
- Petals only slightly notched

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CFAES

Mouseear chickweed

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CFAES

Common chickweed

Stellaria media

- **Winter annual**
- No hair on leaf blade, but on stem & petiole
- Light-green, opposite, egg-shaped leaves
- White petals are deeply notched

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CFAES

Common chickweed

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CFAES

Black medic

Medicago lupulina

- **Summer annual**
- **Trifoliate leaf with extended petiolule**
- Long branching stems
- Prostrate growth habit
- Yellow flowers

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CFAES

Black medic

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CFAES

White clover

Trifolium repens

- Creeping perennial
- **Trifoliate leaf without extended petiolule**
- Leaves have a white "V" mark on upper leaf surface, called a "watermark"
- White flowers

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CFAES

White clover

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CFAES

Prostrate spurge

Chamaesyce humistrata

- Summer annual
- Prostrate growth habit, forms dense mat
- Egg shaped leaves
- Leaves spaced close together on stem
- Milky sap in stem
- Roots at nodes

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CFAES

Prostrate spurge

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CFAES

Common yellow woodsorrel

Oxalis stricta

- Creeping perennial, summer annual
- Little to no hair on stems
- Alternate, smooth, heart-shaped leaflets
- Has rhizomes, creeping woodsorrel has stolons

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CFAES

Common yellow woodsorrel

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CFAES

Common purslane

Portulaca oleracea

- Summer annual
- **Red plastic-like stems, prostrate and hairless**
- Succulent, alternate leaves
- Small yellow flowers

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CFAES

Common purslane

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CFAES

Garlic mustard

Allaria petiolata

- Biennial
- Some hair on stem and petioles
- Leaves are round when in rosette (year 1) and triangular when on stems (year 2)
- Has a garlic odor

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CFAES

Garlic mustard

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CFAES

Velvetleaf

Abutilon theophrasti

- Summer annual
- Serrated, heart-shaped leaves with alternate arrangement
- **Short, soft (downy) hair on entire plant**
- Strong unpleasant odor when broken open

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CFAES

Velvetleaf

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CFAES

Venice mallow

Hibiscus trionum

- Summer annual
- Leaves are deeply broken into 3 to 5 coarsely toothed lobes
- Long petioles
- **90-degree hairs on erect stems**

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CFAES

Venice mallow

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CFAES

Common mallow

Malva neglecta

- **Summer annual**, biennial
- Round, serrated leaves
- Long petioles with stipules at base

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CFAES

Common mallow

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CFAES

Hedge bindweed

Calystegia sepium

- Creeping perennial
- Vining
- Hairless, arrow-shaped leaves that taper to a point
- **Deep notch near petiole of leaf**
- Angle of leaf and petiole ~ 90 degrees

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CFAES

Hedge bindweed

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CFAES

Field bindweed

Convolvulus arvensis

- Creeping perennial
- Vining
- Hairless leaves with short lobes
- True leaves are alternate, and arrowhead shaped
- No notch at petiole

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CFAES

Field bindweed

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CFAES

Tall morningglory

Ipomoea purpurea

- Summer annual
- Vining
- True leaves are alternate, hairy, and heart shaped with pointed apex
- Petioles are long, hairy and have dull green to reddish tint

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CFAES

Tall morningglory

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CFAES

Poison hemlock

Conium maculatum

- Biennial
- Round petioles
- **Purple spots on hairless stems**
- Musty odor when leaves crushed
- Resembles wild carrot
- Poisonous

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Poison hemlock

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Wild carrot
Daucus carota

- Biennial
- Flat petioles
- Pinnately decompound leaves
- **Stem and petioles hairy**
- **No purple on stem**
- Crushed leaves and root smell like carrot

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Wild carrot

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Ground ivy
Glechoma hederacae

- Creeping perennial
- **Round leaves with serrated margins on a stolon**
- Aromatic leaves, smells minty when cut
- Leaves opposite, square stem

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Ground ivy

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Buckhorn plantain
Plantago lanceolata

- Simple perennial
- **Long narrow leaves with pointed tips**
- Basal rosette growth habit
- Short wide spike

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CFAES

Buckhorn plantain

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CFAES

Broadleaf plantain

Plantago major

- Simple perennial
- **Leaves elliptic to oval in rosette stage**
- Little or no purple color at petiole base
- Long narrow spike
- Hair on leaves

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CFAES

Broadleaf plantain

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CFAES

Honeyvine milkweed

Cynanchum laeve

- Creeping perennial
- Vining
- Opposite heart-shaped leaves
- Leaves with white veins, 2 per node
- Foliage exudes a cloudy sap if crushed or cut

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CFAES

Honeyvine milkweed

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CFAES

Common milkweed

Asclepias syriaca

- Creeping perennial
- Upright stem
- Singular stalk with large leaves oppositely arranged
- Hair on leaf underside
- Milky sap

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CFAES

Common milkweed

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CFAES

Eastern black nightshade

Solanum ptycanthum

- Summer annual
- Entire leaves that are usually purple on the underside, especially when young
- Petioles covered with smaller hairs
- Toxic

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Eastern black nightshade

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CFAES

Common ragweed

Ambrosia artemisiifolia

- Summer annual
- Leaf margin pinnatifid
- Leaves mostly opposite
- Stem, petioles, and leaves hairy
- Stem shorter than giant ragweed (2-6 feet tall)

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Common ragweed

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Giant ragweed

Ambrosia trifida

- Summer annual
- Leaf margins entire to 3 to 7 lobes
- Leaves mostly opposite
- Stems very tall (up to 13 feet)

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Giant ragweed

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Canada thistle

Cirsium arvense

- Creeping perennial
- Leaves shallowly-lobed with sparse to no hair
- Spines on stems and leaf margin
- Grooved, branching stems
- Purple seed head

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Canada thistle

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CFAES

Bull thistle

Cirsium vulgare

- Biennial
- Leaves deeply-lobed with lots of hair and long spines on margin
- Rough hairs upper leaf surface and softer hairs below
- Rosette growth habit

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Bull thistle

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CFAES

Horseweed / marestail

Conyza canadensis

- Winter annual, summer annual, biennial
- Grows in a rosette when young
- Tall stalk of very hairy leaves when mature
- Toothed margins

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Horseweed / marestail

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CFAES

Prickly lettuce

Lactuca serriola

- Biennial
- Rosette of basal leaves followed by a singular stem that is sometimes branched
- All parts exude a milky sap
- Leaves deeply lobed with spines on mid-vein of underside

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Prickly lettuce

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CFAES

Common groundsel

Senecio vulgaris

- Winter annual
- Basal rosette
- Bolts to form a mostly singular tall stem
- Small, deeply lobed leaves with long, appressed hairs
- Hollow stem
- Yellow flowers

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Common groundsel

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CFAES

Spiny sowthistle

Sonchus asper

- Summer annual
- Stems and leaves with milky sap
- Slightly lobed leaves with toothed and spiny margins
- **Clasping stem at base of leaf**

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Spiny sowthistle

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Dandelion

Taraxacum officinale

- Simple perennial
- Leaves slightly to non-hairy and form rosette
- Leaves slightly to deeply (to point of runcinate - series of arrow-heads) lobed and milky sap
- Yellow flower

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Dandelion

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Weed control strategies and techniques

1. Correctly identify the plant
2. Determine biological and morphological characteristics and their influence on resistance to control methods
3. Plant life cycle
4. Seasonality
5. Growth habit?
   - Does weed spread by seed? Vegetative structures? Both?
   - Optimal times to use control methods?

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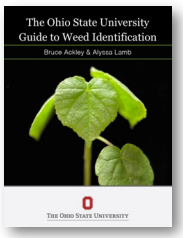
Identify the weed

- Resources



- https://u.osu.edu/osuweeds/multimedia/digital-books/

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SECTION 3

Palmer amaranth

GALLERY 8.3 Amaranthus palmeri, palmer amaranth

Seed head

Amaranthus palmeri, palmer amaranth (SA)

- Leaves have prominent white veins on the underside and are alternate without hairs
- Leaves occur on relatively long petioles and are egg-shaped in outline
- Small, green flowers are produced in compact terminal panicles

Bruce's Fun Facts

- It's petioles are as long as or longer than the leaves
- Practically no hair
- Epic seed heads

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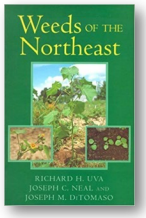
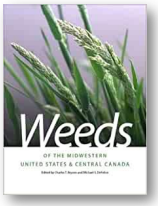
Identify the weed

- Resources





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Cultural methods

- Fast growing crop plants and close plant spacing
- Timely rotations
- Cover crops
  - Over winter (cereal rye, hairy vetch, radish, oats, etc.)
- Pre-season full bed technique (to smother weeds)
  - Physical barriers to prevent weed germination
  - Thick mulches in pathways and common areas
  - Organic mulches like straw, wood bark/chips, newspaper
  - Landscape fabric (breathes), plastic (does not breathe)

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Mechanical methods

- Rapid removal of emerging weed seedlings
- TIMELY cultivating and hoeing to remove weeds
- Hand weeding
- Flame weeders
- Electric weeders
- Post harvest seed destructors

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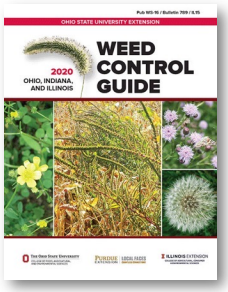
Chemical methods

- Herbicides
  - Depending on your situation, you may have very limited options and collateral damage can be very difficult to avoid



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Non-traditional

- Drones
- Flame weeders
- Electric weeders



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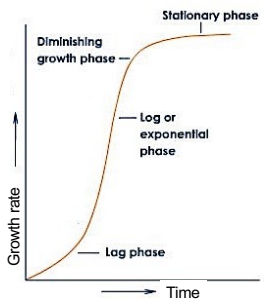
Targeting weed life stages for control

- Annuals
  - Control during lag phase of growth or seedling
  - Control before flowers open (bud stage)
  - Plan around the emergence period



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Targeting weed life stages for control

- Biennials and simple perennials
  - Control in the spring before flowering (bud stage)
    - Vulnerable to mechanical control due to shoot having used up stored underground reserves
- Simple perennials
  - Root crown must be removed
  - Entire root must be killed in some species (e.g., dandelion) that have buds along the root that can sprout new stems

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Carbohydrate cycle in creeping perennials

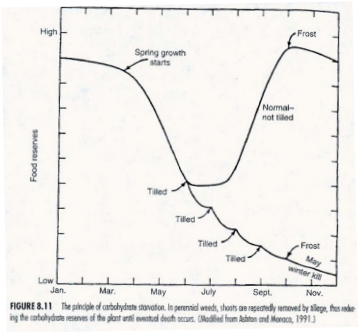

FIGURE 8.11 The principle of carbohydrate starvation. In perennial weeds, shoots are repeatedly removed by tillage, thus reducing the carbohydrate reserves of the plant until eventual death occurs. (Modified from Ashton and Monaco, 1991.)

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Critical period of weed control

- When and what happens
- What are YOUR Goals ???

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Ecological role of weeds, the plus side?

- Re-vegetate disturbed sites
- Build soil
  - Recycle nutrients, add organic matter, protect against erosion
- Sequester carbon
- Provide food & shelter for animals
- Provide food, fuel, fiber, medicine, dyes, & construction materials

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Final thoughts

- Is it a weed to you?
- Think before you act…
- What are your goals?
- Reach out!

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Questions?

Email essman.42@osu.edu
visit https://u.osu.edu/osuweeds/

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