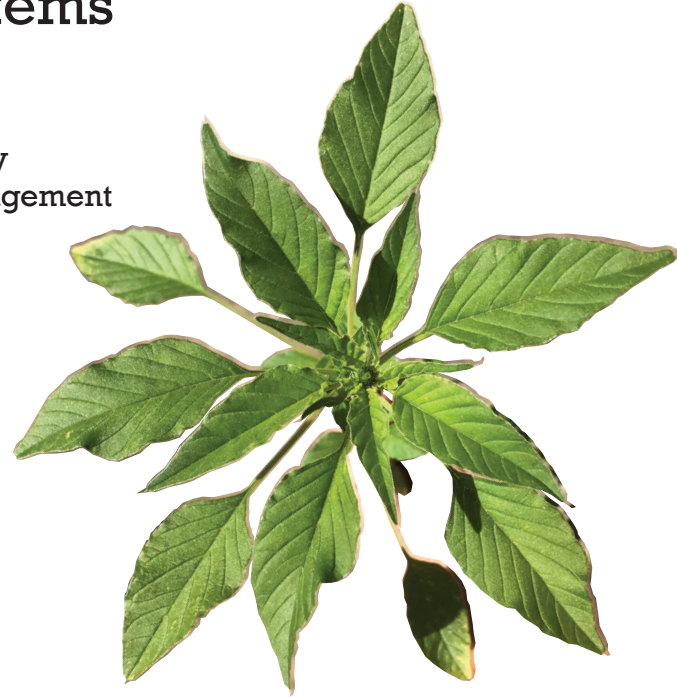


Top Weeds of New York Field Crops: No-Till Systems

Produced by
Cornell University
Weed Ecology and Management
Laboratory



Canada Thistle



Palmer Amaranth



Supported by the USDA National Institute of Food and Agriculture,
Smith Lever project 2018-19-268



General Weed Management Considerations

For herbicide recommendations, see “Cornell Guide for Integrated Field Crop Management”, Section 3.7 “Managing Weeds in Corn” or Section 6.7 “Weed Control in Soybeans”.

- Rotate herbicide mode of action. This is particularly important in no-till production where there is greater reliance on herbicides and resistant weeds are more likely to develop.
- Integrate chemical and non-chemical approaches. Integration of strategies is most important for control of perennial weeds where there are few non-chemical weed control approaches without tillage.
- A well developed burndown and PRE emergence program helps with good weed management.
- Time planting dates to achieve the most competitive crop and optimum yields, generally late April to mid-May for corn and early to late May for soybeans. The highest recommended crop population and narrowest recommended row spacing will produce the most competitive crop against weeds.
- Rotation to crops that are planted in a different season from corn and soybeans and that permit different operations of weed control such as mowing during spring and summer will reduce populations of weeds that would otherwise increase in corn and soybeans.
- Remove problem weeds from the field before seed set to reduce seed bank pressure.

Front page photo credits

Canada thistle photo by Bonsak Hammeraas, NIBIO - Norway, via Bugwood.org

Palmer amaranth photo by Lynn Sosnoskie of Cornell University

Authors: Caroline Marschner, John Teasdale, Anastasia Bartsch, and Antonio DiTommaso

Foxtail Grasses

Setaria spp.

Summer annual grasses. Giant foxtail is the most competitive in corn and soy. Group 2 resistance in 6 states including PA, and ON, CA. Group 1 and 5 resistance in Midwestern states.

- A dense layer of surface residue from a winter annual cover crop will suppress or delay emergence.

- Early planting, high crop population, and narrow row spacing will increase crop competitiveness against this shade-intolerant species.

- Remove large plants before they go to seed.

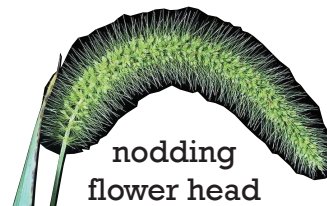
- Rotate to winter grain or hay crops that suppress spring establishment and prevent seed production.

giant foxtail has fine hairs on upper leaf

Flower spike photos:
Doug Doohan, OSU
Bugwood.org

Ligule and leaf photos:
Scott Morris, Cornell
University

Giant foxtail



nodding
flower head



fringed
ligule

Yellow foxtail



wispy
hairs
near
collar

Green foxtail



no leaf
blade
hairs



all
foxtails:
upright
habit,
'foxtail'
flower
head

above/below:
Doug Doohan
Ohio State U.
Bugwood.org

foxtail seedling



Quackgrass

Elymus repens

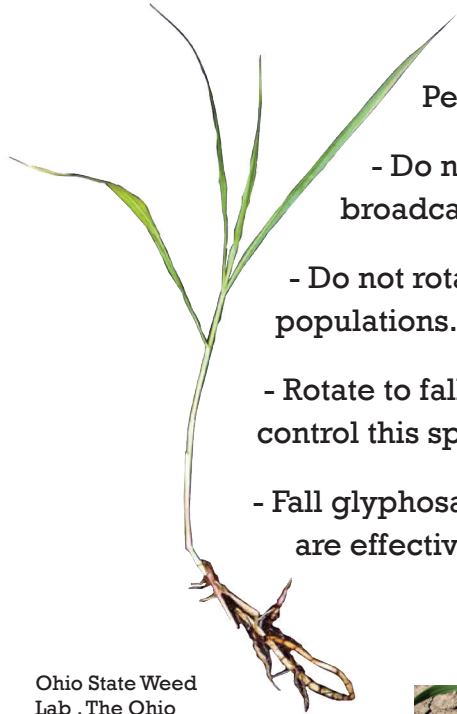
Perennial grass, spreading by shallow rhizomes.

- Do not overfertilize with N, and sidedress rather than broadcast most N required for corn.

- Do not rotate with alfalfa or other hay crops, which will increase populations.

- Rotate to fallow, or to crops where repeated management can control this species.

- Fall glyphosate application and some group 1, 2, and 5 herbicides are effective.



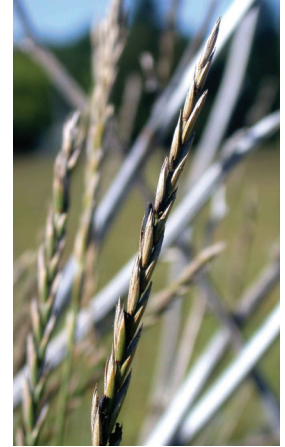
perennial grass
with spreading habit



sharp, pointed
rhizomes

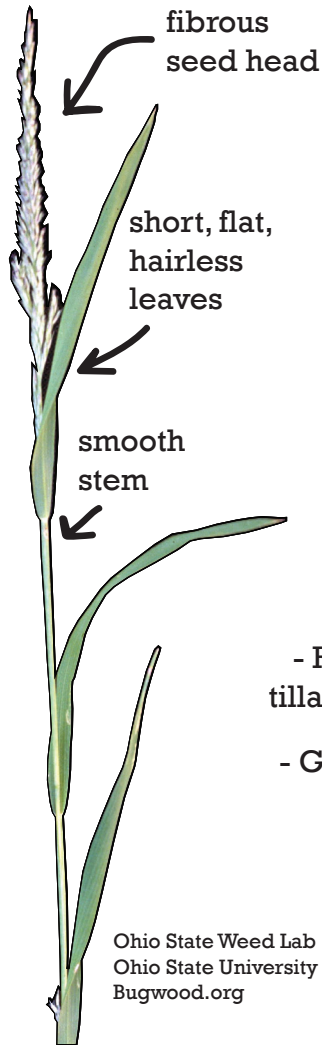


single flower
spikes



clasping
auricles





Ohio State Weed Lab
Ohio State University
Bugwood.org

Wirestem Muhly

Muhlenbergia frondosa

Perennial grass, spreading by shallow rhizomes and seeds.

- Early planted crops with narrow row spacing can develop a competitive leaf canopy that suppresses this late-emerging weed.
- Prevent spread of rhizomes, stem fragments and seeds on equipment.
- Rotate to alfalfa or other hay crops where frequent mowing will deplete storage reserves.
- Rotate to fallow or crops where repeated tillage can control this species.
- Glyphosate is effective against this weed.

stiff, wiry stems
roots where stems touch ground



Ohio State Weed Lab , The Ohio State University, Bugwood.org

short, thick, scaly rhizomes



Antonio DiTommaso
Cornell University

Common Lambsquarters

Chenopodium album

Common summer annual; prolific seed producer. Some NY populations are resistant to group 5 herbicides (atrazine).

- Surface residue from a winter annual cover crop will suppress emergence
- Do not overfertilize with N, and sidedress rather than broadcast most N required for corn

- Remove large plants before they go to seed

- Rotate to winter grain or hay crops that suppress spring establishment and prevent seed production

- Chemical fallow before planting helps control this early emerging species

long, narrow cotyledon
no visible midvein
purple below

tiny, whitish
to pink flower
clusters

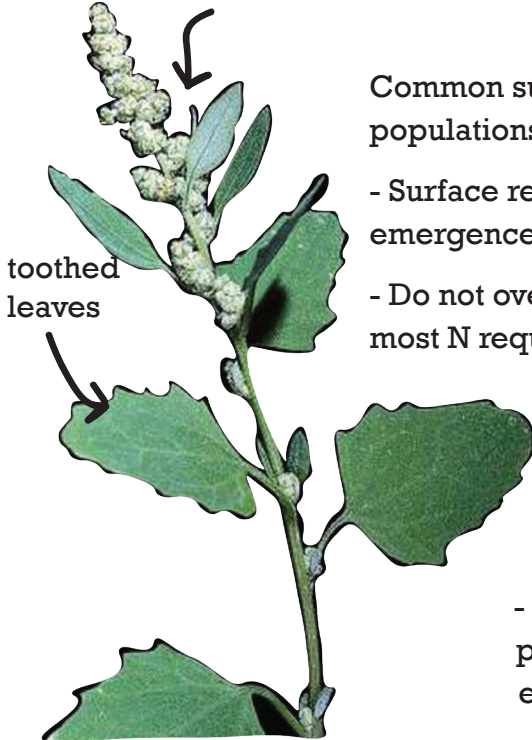


From "Weed Identification, Biology and Management", by Alan Watson and Antonio DiTomaso



Cornell University's Weed Ecology and Management Lab

gray coating on
young leaves



toothed
leaves

Joseph M. DiTomaso of UC-Davis,
via Bugwood.org

long, thin
flowering stalks



Joseph M. DiTomaso, University of California - Davis, Bugwood.org



Steve Dewey, Utah State University bugwood.org

Common Ragweed

Ambrosia artemisiifolia

Summer annual; emerges in early spring. In NY, Group 5 (atrazine) resistant and under study for glyphosate resistance.

- POST applications after plants reach 4" are largely ineffective. Effective PRE programs are useful.
- Not suppressed by rolled-rye, since it emerges prior to rolling.
- A winter annual cover crop that establishes a complete leaf canopy by early spring will suppress emergence.
- Plant as late as possible to allow destruction of early emerging seedlings before planting.
- Remove large established plants before they go to seed.
- Rotate to a competitive late-spring planted crop that allows for a pre-plant cultivated fallow, or to a crop where ragweed flowering stalks can be mowed in mid-summer.

thick cotyledon with
speckled edges



Antonio DiTomaso

deeply lobed
first leaves



Bruce Ackley, Ohio State University, Bugwood.org

Horsenettle

Solanum carolinense

Thorny perennial herb spreading by deep horizontal roots.

- This weed is likely to increase in long-season no-till crops like corn and soybean, so non-chemical control is best achieved in rotational crops.

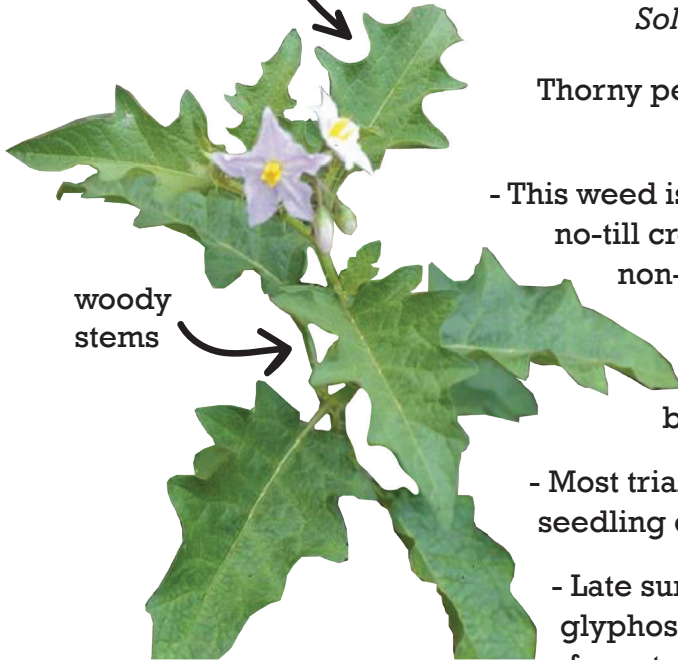
- Mowing will not kill this weed, but will prevent seed production.

- Most triazine herbicides are effective for seedling control at planting.

- Late summer to early fall application of glyphosate or dicamba is most effective for established plants.

- Rotate to crops that permit early fall management of established plants.

lobed leaves



woody stems



Ohio State Weed Lab , The Ohio State University,
Bugwood.org



small, cherry tomato-like fruit

Photos: Weed Ecology and Management Lab, Cornell University

5 petalled white to purple flowers



spines on stem and leaf veins



smooth, lance-shaped first true leaves



Photos: Weed Ecology and Management Lab, Cornell University

Horseweed

Erigeron canadensis

Winter or summer annual. This prolific seed producer is resistant to multiple herbicides in parts of New York, including groups 2 (ALS inhibitors), 9 (glyphosate), and 22 (paraquat).

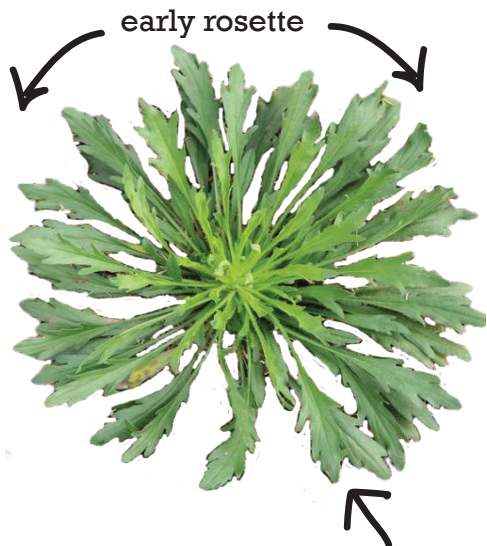
- Winter annual cover crops with a dense leaf canopy will suppress establishment and growth.

- Mowing will not eliminate, but will reduce seed production.

- Seeds are short-lived, so management that prevents seed production are effective within a few years.

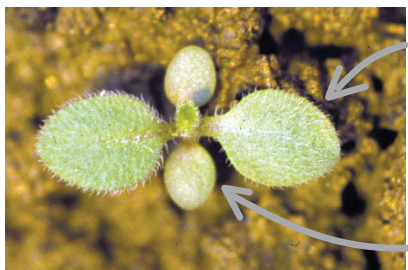
- This species has a high seed-dispersal capacity, so eliminate plants from surrounding field edges and non-crop areas.

- Group 4 (2,4-D, dicamba) herbicides are effective against horseweed in NY.



Robert Vidéki, Doronicum Kft., Bugwood.org

hairy leaves



Scott Morris, Cornell University

hairy, egg shaped first leaves

tiny cotyledons

mature plants



Lynn Sosnoskie
Cornell University

hairy stems



white flowers



Antonio DiTomasso, Cornell University

Palmer Amaranth

Amaranthus palmeri

Annual herb with rapid growth, abundant seed production, and resistance to multiple herbicides.

- Surface residue from a winter annual cover crop will suppress emergence.

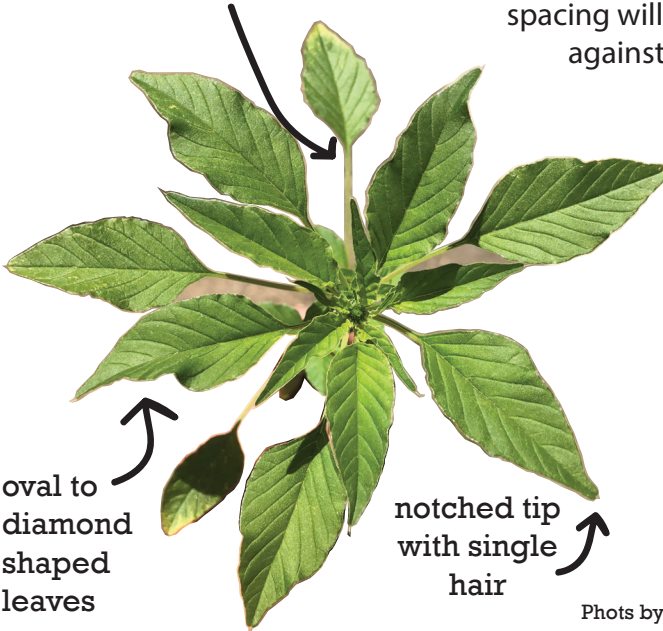
- Early planting, high crop population, and narrow row spacing will increase the competitiveness of crops against this late-spring emerging weed.

- Seeds remain on the plant, so removal of large plants before harvest or residue and chaff during harvest can substantially reduce seed input to the field.

- Rotation to winter grain or hay crops will suppress spring establishment, prevent seed production, and reduce the soil seedbank.



lower petioles
longer than leaf



oval to
diamond
shaped
leaves

notched tip
with single
hair

long cotyledons with
visible midvein



Notched
leaf tip

up to 12' tall;
smooth, hairless stem



Tall waterhemp

Amaranthus tuberculatus

Annual herb with a long emergence window, rapid growth and abundant seed production. Can be resistant to groups 2, 5, and possibly group 9 (glyphosate) herbicides.

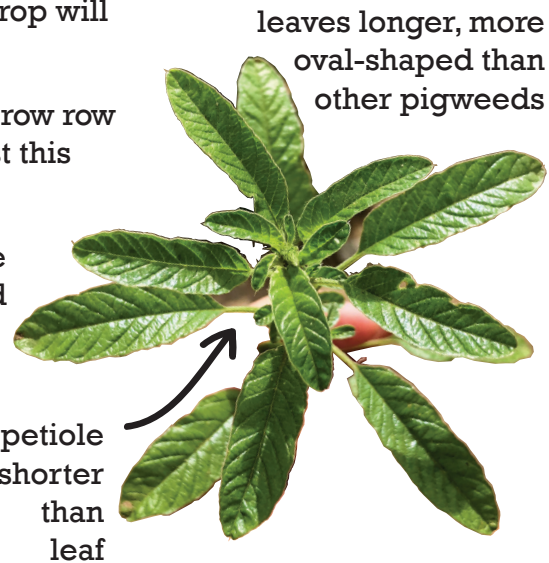
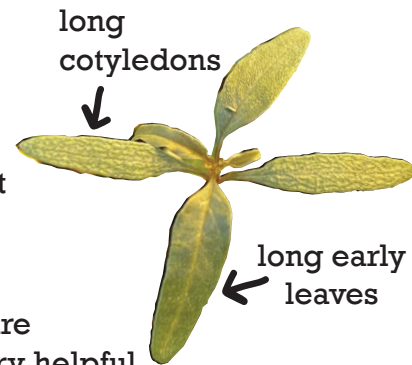
- Timing is critical for POST applications; applications are ineffective on plants > 4" height. PRE treatments are very helpful with this weed.

- Surface residue from a winter annual cover crop will suppress emergence.

- Early planting, high crop population, and narrow row spacing increase crop competitiveness against this late-spring emerging weed.

- Seeds remain on the plant, so removing large plants before harvest or removing residue and chaff during harvest can substantially reduce seed input to the field.

- Rotation to winter grain or hay crops suppresses spring establishment, prevents seed production, and reduces the weed's seedbank in the soil.



waterhemp leaf

Palmer amaranth leaf



hairless green, red, or striped stems

All photos: Lynn Sosnoskie
Cornell University

center flower
often purple

white outer
flowers

umbrella
shaped

hairy
stem

Wild Carrot

AKA: Queen Anne's Lace

Daucus carota

Biennial herb. Looks similar to harmful species in the same (carrot) family; make sure of ID before handling.

- Keep roadsides and non-cropland mowed to prevent spread into fields,
- Establish a dense winter annual cover crop to suppress overwintering plants,
- Rotate to small grains or hay crops where harvesting/mowing, particularly in July, will prevent seeding,
- Rotate to crops where tillage can control this species.

narrow cotyledons
first leaves deeply
dissected

John Cardina, Ohio State
University, Bugwood.org

hairless, fernlike
leaflets



John Cardina, Ohio State
University, Bugwood.org



Ansel Oommen, Bugwood.org

Canada Thistle

Cirsium arvense

Aggressive perennial spreading from deep storage roots below the plow layer.

- Control of this species requires exhaustion of storage root reserves, which usually takes 2-3 years.

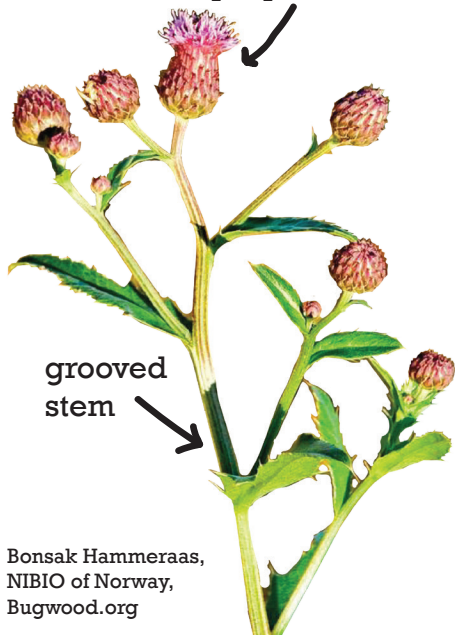
- A multi-year rotation of crops and fallow that permits repeated mowing and smothering with competitive crops is effective.

- Prevent dispersal from field edges and non-cropland as well as in straw or hay.

- A competitive no-till planted crop will shade this species and minimize growth and damage.

- herbicide applications between bud and flowering are most effective.

many small,
purple flowers



grooved
stem

Bonsak Hammeraas,
NIBIO of Norway,
Bugwood.org



fleshy
cotyledons

Ohio State Weed Lab ,
Ohio State University,
Bugwood.org

spiny, wavy leaf edge



Leslie J. Mehrhoff, University of
Connecticut, Bugwood.org

leaf clasps stem



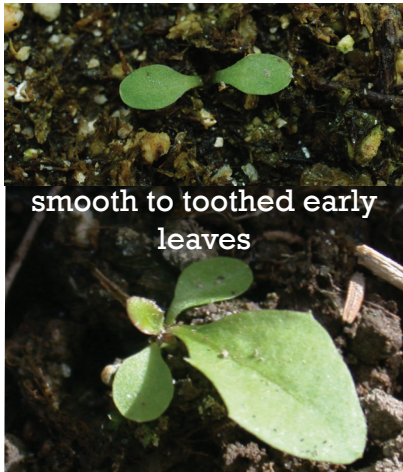
Rob Routledge, Sault College,
Bugwood.org

extensive rhizomes



Merrill Ross, Control Practices
for Canada thistle

yellow-green spatulate
cotyledons



smooth to toothed early
leaves



rosette is mature form
leaves lobed and toothed
teeth point towards plant base

Dandelion

Taraxacum officinale

Rosette forming perennial; more a problem from its visual weedy appearance than from competition.

- Prevent seed production and spread from areas adjacent to the field in spring
- Apply herbicides in the fall, when the plant is pulling resources into the overwintering root. Glyphosate, dicamba, and 2,4-D are effective.
- Rotation to an early-harvested crop provides a good window for perennial weed management.
- Avoid excessive liming or high K levels, both of which favor dandelion growth.
- Flaming, tine weeding, and straw/crimped cover crops are all effective against seedlings.

yellow petals
are notched



One
flower-head
on leafless
stem



Wind
dispersed

Field Bindweed

Convolvulus arvensis

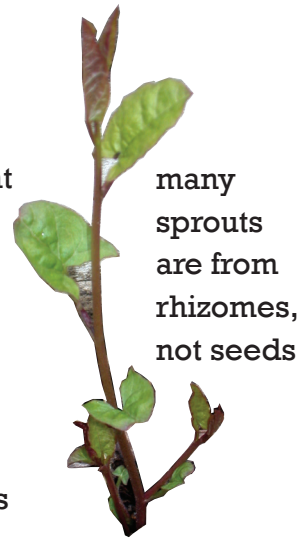
pink to white flowers
tiny bracts below flower base



Lynn Sosnoskie
Cornell University

Twining perennial with an extensive root system that competes with crops for soil moisture. No herbicide resistance listed in the US.

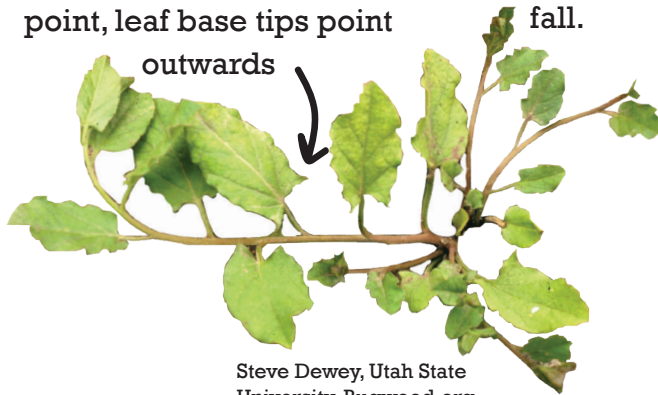
- Plant a winter annual cover crop that provides good ground cover in spring before planting.
- Rotate to winter grain crops or alfalfa.
- 2,4-D and glyphosate are best applied when plants are in spring bloom.
- Other herbicides work best when applied in the fall.



many
sprouts
are from
rhizomes,
not seeds

Antonio DiTommaso
Cornell University

alternate leaves; rounded
point, leaf base tips point



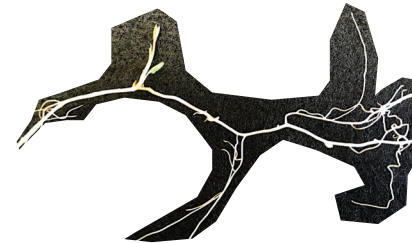
Steve Dewey, Utah State
University, Bugwood.org



Caroline Marschner
Cornell University

seedlings
have
squareish,
indented
cotyledons

Extensive rhizomes



Lynn Sosnoskie
Cornell University

Hedge Bindweed

Calystegia sepium

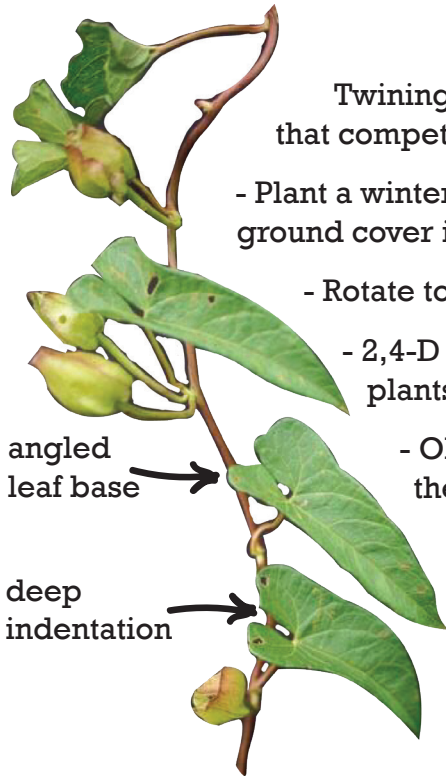
Twining perennial with an extensive root system that competes with crops for soil moisture.

- Plant a winter annual cover crop that provides good ground cover in spring before planting.

- Rotate to winter grain crops or alfalfa.

- 2,4-D and glyphosate are best applied when plants are in spring bloom.

- Other herbicides work best when applied in the fall.



angled leaf base

deep indentation

Ohio State Weed Lab , The Ohio State University, Bugwood.org

leaf tip pointed, angled leaf bases point away from stem



white (or pink) flowers with large bracts at base



squarish cotyledons



Above, top, and left:
Antonio DiTommaso, Cornell University

Hemp Dogbane

Apocynum cannabinum

Perennial; can be poisonous to livestock.

- Early planted crops can develop a leaf canopy before dogbane emergences in spring.
- Rotate to alfalfa where frequent mowing will deplete storage reserves.
- Fall application of glyphosate is effective against this weed.

- Rotate to fallow or crops where repeated management can be used to control this species.

long, narrow cotyledons



Ohio State Weed Lab , The Ohio State University, Bugwood.org

clusters of bell shaped, greenish white flowers



William M. Ciesla, Forest Health Management International, Bugwood.org

white central vein

opposite oval leaves, smaller than milkweed, on branched stems

long, narrow seedpods; wind dispersed seed



Antonio DiTommaso
Cornell University

Common Milkweed

Asclepias syriaca

Perennial herb spreading by deep storage roots.

- Early planted crops can develop a leaf canopy before milkweed emerges in spring.

- Rotate to alfalfa where frequent mowing will deplete storage reserves.

- Rotate to fallow or crops where repeated management can control this species.

- Herbicide application at late bud/flowering stage is most effective.

pink to purple flowers



Antonio DiTommaso

large pods, seeds with long, silky hairs



Lynn Sosnoskie, Cornell University



waxy, stiff leaves with white midvein

hollow, downy-haired stem

Richard Gardner, Bugwood.org



oval cotyledons on seedlings

Antonio DiTommaso



spring growth from rhizome

Antonio DiTommaso



milky white sap

Antonio DiTommaso