

WEEDS

What you need to know to manage them safely and successfully

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What is a weed?

- Any plant growing where it is not wanted

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Why do we care about weeds?

- Aesthetics
- Competition with desirable plants for water & nutrients
- Weeds can harbor diseases, insects & rodents

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Yield

Crop	Yield	
	Weedy	Nonweedy
Carrots	27.9 lb	503.3 lb
Beets	45.9 lb	240.3 lb
Cabbage	129.1 lb	233.6 lb
Onions	3.6 lb	67.7 lb
Tomatoes	23.2 lb	164.2 lb
Potatoes	52.7 lb	148.3 lb

*Plot sizes not specified, but weedy and nonweedy plots were equal in size. With the exception of weed management, both plots were treated the same.

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Why are weeds so successful?

- Rapid growth
- Reproduce quickly & in high numbers
- Well-adapted seed dispersal techniques
- Long-lived seeds
- Adaptable to various environmental conditions
- Delayed dormancy allows seeds to germinate when conditions are favorable

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Weed species	Number of seeds per plant	Seed survival (years)
Lambsquarter	72,450	40
Purslane	52,300	40
Dandelion	15,000	6
Pennsylvania smartweed	19,300	30
Canada thistle (per stem)	680	21
Pigweed	117,400	10
Barnyardgrass	7,160	3
Crabgrass	25,000	3

Note: Seed survival means that some viable seed remains. Generally, however, most seeds germinate or lose viability within 3 to 10 years or less, depending on soil conditions. A few, however, will hang on to aggravate future gardeners.

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Classifications of weeds

- Growth habits
- Life cycles
- Vascular systems
- Root systems

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Growth habits

- Basal rosette
- Prostrate
- Vining
- Woody

Why is this important?

This information aids in the proper identification of the plant

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Life cycles

- Annuals
- Biennials
- Perennials

Why is this important?

A weed's life cycle dictates the proper timing of management techniques

Example: Little western bittercress is a winter annual that flowers from March to July

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Vascular systems

- Monocotyledonous (grasses)
- Dicotyledonous (broadleaves)

Why is this important?

Herbicides often target one while not harming the other (selectivity)

Selective broadleaf herbicides:

2,4-D, dicamba, mecoprop (MCP), triclopyr (lawn weed killers)

Selective grass herbicides:

Sethoxydim (Poast)

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Root systems

- Fibrous
- Taproots
- Stolons/rhizomes

Why is this important?

Root systems often dictate the appropriate management practices

Example: Don't till quackgrass!

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Management techniques

- Prevention
 - Cultural control
 - Biological control
 - Chemical control
- No one technique alone will likely be successful; an integrated approach is always best!

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Prevention

- Monitor imported soils, soil amendments and nursery stock for “new” weeds
- Use mulches
- Pre-emergent herbicides
- Cultivation, rotations, cover crops
- Irrigation practices
- Coordinate efforts with neighbors

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Cultural control

- Till, hoe or pull weeds (early & often!)
- Rotation (aggressive/non-aggressive crops)
- Fallow (clean till or cover crop)
- Close plant spacings
- Flaming
- Water management
- Solarization

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Biological control

- Insects: Tansy ragwort, St. Johnswort, rush skeleton weed.
- Disease: Rust on blackberry
- Works on some introduced plants that have minimal natural pressures. Host specific.
- Usually when insects or diseases released will take 3-5 years for impact to be seen.

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Chemical control

- Knowledge and precision required
- I.D. the weed
- Proper timing for maximum affect
- Know what plants to protect
- Use personal protective equipment
- **READ THE LABEL!**
- Always use a spreader sticker

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Chemical control

KNOW THE MODE OF ACTION

Types of herbicides:

- Selective/non-selective
- Preemergent/postemergent
- Contact/systemic
- Organic/inorganic (organic/synthetic)

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Chemical control hints

- Foliar- coincide spray with period of maximum translocation to the roots.
- Avoid drift by- increasing droplet size, spray when minimal breeze <5mph.
- Amine or Ester- use amine, lower vapor drift. Don't spray if temps over 80f.
- Granular- apply at low temps, water in.
- Herbicides- are large C molecules

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Are Integrated Weed Control Methods the Same as Sustainable?

- Yes!
- Sustainable methods use many types of control systems too and they minimize inputs where possible.

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Sustainable Weed Toolbox

- The growers knowledge and observation
- Vigorous crop
- Crop rotation
- Cover crops
- Mulches
- Tillage
- Mowers
- Flamers

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Know Your Weeds

- Good weed ID skills
- Helps you apply the right control at the right time
- Summer annuals, winter annuals, perennial, biennial, invasive perennial
- Two grasses: one annual, one perennial with rhizomes

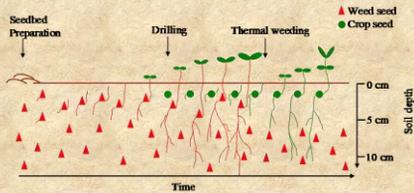
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Knock the Weeds at Critical Times

- Timely cultivation, flaming, mowing, pulling, or mulching is critical
- Get weeds when small
- Blind cultivation: after planting before emergence for larger seed
- Stale seed bed: let weeds germinate, kill with flaming, seed without cultivation
- Never let weeds go to seed

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Stale Seedbed, Thermal Weeding



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Grow Vigorous Healthy Crops

- In the garden vigorous closely planted crops allow no room for weeds
- Don't push the season for crops (early/late)
- Use new seed, primed or conditioned seed
- Plant weakest plants on your best soil

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Grow Cover Crops

- Fill open niches that weeds favor
- Some cc inhibit weed seed germination
- Retain moisture for the crop when mulched
- Choose cc for the right season (warm/cool)
- Inter seeded, over seeded, seeded in row

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Cover Crop Options-Legumes

- Cool (Aug-Sep) plant
- Hairy vetch
- Sub clover
- Crimson clover
- Austrian Winter Pea
- Purple vetch
- Fava bean
- Warm Season (April)
- Purple vetch
- Fava bean
- Cowpeas
- Sweet clover

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Cover Crop Options

- Cool Grasses (fall)
- Winter Rye
- Winter Wheat
- Triticale
- Barley
- Warm (spring) plant
- Buckwheat
- Oats
- Spring barley
- Sorghum
- Millet

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Tillage

- Promotes weed seed germination, especially deep tilling
- Weed seed usually germinates in the top 1-2" only
- 5-10% of weed seed is not dormant

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Gardener Techniques, Stale Seedbed

- Till to prepare site
- Let weed seed germinate
- Retill area with rototiller (1-2" deep), keep the tiller shallow and level
- Or flame area after tilling

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Stale Seedbed Technique

- Drilled leaf beets
- Stale Seedbed



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Keep the Weeds Guessing, Diversify Cropping Systems

- Rotations and different weed control systems make it hard for a few species to dominate
- Change crop type on certain fields: cool season/warm season
- Vary dates of tillage, planting, harvest, and depth

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Keep Observing Weeds and Adapt

- Every yard has different conditions
- You may have to adjust proven systems
- Increasing annuals means too much tillage
- If summer weeds get bad, rotate field to cool season crops and cover crop during summer.
- Increasing invasive perennials may mean more tillage is necessary

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Weed Identification & Control

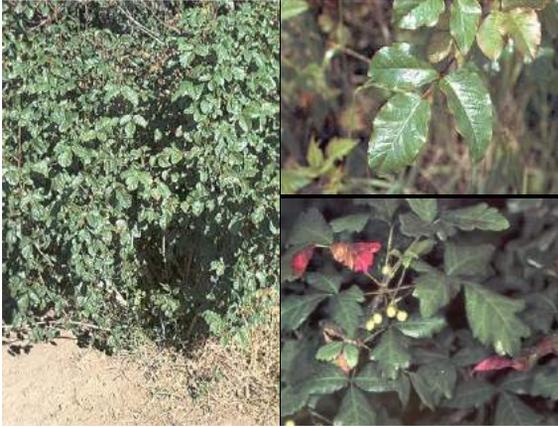
Common weeds, their characteristics,
and how to manage them

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Poison oak: an example of nature's adaptability

- *ID*: leaves three, leave it be! Often a climbing shrub.
- *Control*:
 - Roundup (glyphosate)
 - Best results if applied after fruit has formed & before leaves lose their green color; use higher *labeled* rates for plants that have reached the woody stage of growth.
 - Garlon (triclopyr)
 - Apply when plants are actively growing; foliage must be thoroughly wet.

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Himalayan blackberry

- *ID*: weak-stemmed shrub with leaves that are palmately compound, typically with five large, oval, toothed leaflets.
- *Control*:
 - Tordon
 - Apply in late spring after leaves are fully developed; foliage must be thoroughly wet, and reapplication will be required as regrowth occurs.
 - Roundup
 - Apply when canes are actively growing and after flowers or berries are formed; fall treatments before a killing frost not as good.
 - Garlon
 - Apply when plants are actively growing; foliage must be thoroughly wet.

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Scotch broom

- *ID*: woody shrub.
- *Control*:
 - Roundup
 - Apply to actively growing plants in the spring.
 - Garlon
 - Apply any time the plants are actively growing; a thorough wetting of the foliage is essential.

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Large crabgrass

- *ID*: summer annual 6" to 2' in height; leaf blades are flat and 1/4 to 1/2 inch wide with sheaths that have long, stiff hairs.
- *Control*:
 - Roundup, post emergent
 - Poast (sethoxydim), post-emergent
 - Dimension (dithiopyr), post-emergent
 - Halts (pendimethalin), pre-emergent

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Annual bluegrass

- *ID:* annual that, even when fertilized, tends to remain a light green; seedheads commonly visible from March to August.
- *Control:*
 - Roundup
 - Casoron

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Little western bittercress

- *ID:* annual, winter annual or biennial, 2 to 12 inches tall with seeds that often eject explosively.
- *Control:*
 - Roundup
 - 2,4-D
 - Casoron

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English daisy

- *ID:* perennial with a prostrate growth habit.
- *Control:*
 - Roundup
 - Dicamba
 - Triclopyr

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Field bindweed (morningglory)

- *ID*: perennial, vining habit, from taproot up to 10 feet deep with extensive lateral roots.
- *Control*:
 - Roundup
 - Apply at full bloom to early seed stage of maturity; application on fall regrowth may provide some control.
 - Tordon
 - Apply as a coarse, low-pressure spray in sufficient volume for adequate coverage; timing is not critical, but results are most consistent if bindweed is early but to full bloom.
 - Dicamba or Weedmaster (dicamba + 2,4-D)
 - Apply during fallow prior to planting and when weeds are actively growing for suppression; apply in late summer or fall, prior to killing frost for control (best control is achieved when weeds are actively growing and in postbloom stage).

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