



Vegetable Garden Weed Management

Tony Koski, Extension Turf Specialist

Weeds compete with vegetables for light, water and nutrients, can interfere with harvesting and may increase the potential for vegetable disease problems. Complete elimination of weeds in the vegetable garden is neither realistic nor necessary. Effective weed management can employ several strategies, depending on weed species involved and personal preferences regarding use of pesticides and other weed management tools.

Understand the Sources of Weeds

- Weed seed exists in all garden soils
- Manure, compost, and other soil amendments often contain weed seed
- Imported topsoil will always contain weed seed (no matter claims to the contrary), and may contain rhizomes, bulbs and other plant parts that may grow into a weed
- Plant-based mulch materials (straw, hay, grass clippings) may contain weed seed
- Weed seed can be moved into gardens by wind, water, humans or animals
- Weeds may move from other areas of your landscape, adjacent fields, neighboring landscapes by above- (stolons, runners) or below-ground (rhizomes) laterally growing stems
- It is impossible to prevent or eliminate weeds – but persistent, proper management can result in a nearly weed-free vegetable garden
- Soil disturbance (tilling, digging, hoeing, pulling weeds, foot traffic) encourages weed seed germination

Preventing Weed Growth

Weed prevention is always preferable to (and easier than) having to manage weeds after they have begun growing. Prevention involves a combination of practices – cultural and chemical (optional) – which create conditions unfavorable for weed growth.

Cultivation Practices

- Soil disturbance encourages weed seed germination by exposing buried seed to light – a stimulus for seed germination (buried seeds don't germinate)
- Consider preparing soil (tillage, amendment incorporation) for planting 3-4 weeks prior to planting and control emerging weeds ("fallowing")
 - As weeds emerge, but prior to planting, cultivate **SHALLOWLY** to kill seedling weeds
 - Kill emerging weed seedlings with synthetic or "natural" herbicides (see below)
 - Kill emerging weed seedlings by flaming (see below)
- If herbicides or flaming aren't options, mulch immediately following tillage
- If soil doesn't require amendment prior to planting, consider use of a broadfork to loosen soil (this reduces weed seed movement to the surface of the soil)



Plant Spacing

- Use recommended plant spacing to create competition for weeds
- Consider the use of block planting to increase competition against weeds
- The critical weed-free period for most warm-season vegetables is about 45 days after planting, after which time plant canopy will be big enough to shade the weeds and inhibit their growth. Thus, early-season weed control is critical
- Squash, corn, potatoes, cabbage, broccoli, tomatoes are strong competitors against weeds
- Lettuce, carrots, peppers, onions, peas, radish are poor competitors against weeds



Mulch

- Will smother existing weeds and/or prevent germination of weed seeds
- Grass clippings are ideal mulch for vegetable gardens
- Hay and straw can be effective mulch, but may introduce weed seeds to the garden
- Wood chips and sawdust should be used sparingly; their decomposition can increase the need for nitrogen
- Newspaper and cardboard can be used between rows (must be weighed down)
- Plastic mulch can be used to increase soil temperature for warm-season crops
- All mulches will reduce water loss and irrigation needs (especially plastic mulch)

Irrigation Practices

- Overhead sprinkler irrigation, which also applies water to soil where plants are not growing, will encourage weed growth
- Drip irrigation wets a lesser amount of soil and encourages less weed growth
- When drip irrigation and mulch are used together, weed problems in the vegetable garden are significantly reduced
- Use of drip irrigation will reduce the potential for disease occurrence and spreading of disease pathogen by splashing
- Drip irrigation will produce equivalent yields but uses less water than overhead irrigation





Thermal Weeding (flaming, steam, boiling water)

- Used on fallowed seedbeds before vegetable seedlings emerge
- Can be used between rows after vegetable emergence
- Burning and/or fire hazard is an obvious concern
- Most effective on seedling broadleaf weeds; less effective on grasses and sedges
- Not effective on perennial weeds unless repeated

Solarization

- Soil is covered with clear plastic (gets hotter than black plastic) for 4-6 weeks to kill weeds, weed seeds, and some plant pathogens
- Can be very effective if done during warmest time of the year
- Garden can't be used during solarization process
- Any subsequent tillage will bring weed seeds to surface (only seeds in surface 2-3 inches will be killed)



Herbicides for Use in Vegetable Gardens

Synthetic

- Glyphosate (Roundup, Kleenup, many other names)
 - Non-selective; postemergence
 - Systemic; good for perennial weed control
 - No root activity; no soil residual
 - No activity on seeds
- Trifluralin (Preen)
 - Preemergence
 - Kills germinating seeds
 - Will not control weeds you can see
 - Short residual (6-8 weeks)
 - Soil disturbance will reduce effectiveness



"Natural"/Organic

- Corn gluten meal (CGM)
 - VERY limited preemergence activity – if any
 - Short residual (4-6 weeks), if any
 - Contain 10% nitrogen
 - Rates and application frequency recommended for weed control may encourage excessive vegetable growth
- Soaps, essential oils, acetic acid, iron sulfate
 - Non-selective (can damage desirable plants)
 - Disrupt leaf cuticle; burns leaves
 - Not systemic; full coverage of weed is essential
 - Most effective on seedlings; **PERENNIALS WILL GROW BACK**
 - Must be reapplied for control of larger/perennial weeds

Managing Difficult Perennial Weeds in the Home Landscape



The four most difficult weeds encountered in the home landscape – lawns, vegetable gardens, flower and shrub beds – include four perennial weeds: bindweed, Canada thistle, quackgrass and bermudagrass. Though these are very different species, they behave similarly as weeds in the landscape. All are non-native, deep-rooted perennials that spread by underground rhizomes (bermudagrass also spreads above-ground by stolons or runners). While all can produce seed, the main way that they spread in the landscape is by their laterally growing stems. They all can survive – and even thrive – without any supplemental irrigation and will persist through the longest and most severe droughts because all four produce extremely deep roots (as deep as 6 feet or more). **The key to eradicating these perennial weeds is to interrupt/prevent photosynthesis and depleting stored energy by forcing the plant to continuously produce new shoots, leaves, and roots.** By reducing the plant's ability to re-supply underground energy reserves via photosynthesis, it uses up energy by constantly re-growing new leaves, stems, and roots.

MULCHING prevents photosynthesis and forces the plant to use energy to push leaves and stems through the mulch layer

- Deeper mulch (3-6 inches) is more effective
- Sheet mulching (using newspaper or cardboard) under a layer of soil or other mulch can be very effective – but weeds will grow laterally and emerge at the borders of the sheet mulched area
- Pull/cut plant tops (or spray with appropriate herbicide) as soon as they grow through the mulch
- Persistent, diligent removal of new growth that emerges through and at the borders of the mulch will result in successful control – but this may take years (especially if herbicides are not used)

CULTIVATION (plowing, tillage, hoeing, pulling) can be effective if performed diligently and persistently through consecutive growing seasons

- Will be more effective if done in conjunction with herbicides
- Cultivation will disturb the weed seed bank and may lead to other weed problems

SOLARIZATION can be an effective tool for managing these perennial weeds

- Subsequent tillage of a solarized area may result in germination of buried, unkilld seeds
- Weeds can still infest the solarized area from its borders

BIOCONTROLS

- Biocontrols never result in total eradication of the weed; rate of weed population reduction can be slow
- There are no biocontrols for quackgrass or bermudagrass
- Bindweed mite (*Aceria malherbae*) can be effective where bindweed receives no irrigation
- For more information on using bindweed mites go to:
http://www.colostate.edu/Dept/CoopExt/Adams/weed/bindweed_mite.html



HERBICIDES can be effective when used with the above management tools

- Glyphosate (Roundup, Kleenup, many other product names) is the only synthetic POSTEMERGENT herbicide that can legally be applied to vegetable gardens by the home gardener for control of these perennial weeds
- Glyphosate can provide excellent perennial weed control when used with mulching and cultivation practices
- Corn gluten meal will be ineffective for managing perennial weeds, and may increase their aggressiveness because nitrogen in CGM may stimulate weed growth
- Use of acetic acid/vinegar and other “natural”/organic weed control products will only be effective if used repeatedly and in conjunction with other management tools described above