THE FALL EDIBLE GARDEN

Waterwise and sustainable practices
for year round edible gardens

The Waterwise Fall Edible Garden

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UC Master Gardener

Fall Edible Garden

- Review of waterwise principles for the edible garden
- Preparing for the fall edible garden
- Fall crop selection
- Cover crops for water conservation and soil health
- Composting primer

KEYS TO WATER WISE GARDENING

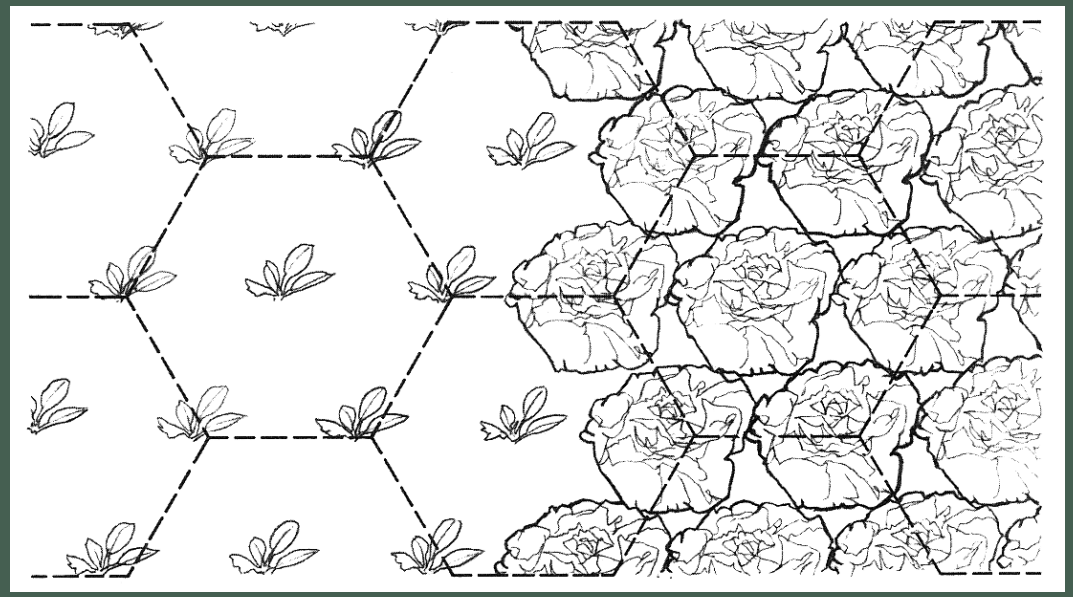
- Garden plan to minimize water use--right plant, right place, right time
- Planting methods to minimize water use—proper spacing
- Soil improvement and creating living soil--compost
- Water effectively and efficiently—use drip irrigation if possible
- Protecting the soil throughout the year—MULCH!
- See YouTube video: https://www.youtube.com/watch?v=YftVCS0xEX8&t=18s

Garden plan to minimize water use—right plant, right place, right time

AUGUST	SEPTEMBER	OCTOBER
Beet (S,T)	Bean, fava (S)	Bean, Fava (S)
Broccoli (T)	Beet (S, T)	Broccoli (T)
Brussels Sp (T)	Broccoli (T)	Garlic (sets)
Cabbage (T)	Carrot (S)	Lettuce (S,T)
Celery (T)	Cauliflower (T)	Mustard (S)
Collards (S)	Celery (T)	Parsnip (S)
Kale (S,T)	Collards (S)	Pea (S)
Kohlrabi (S,T)	Kale (S,T)	Radish (S)
Lettuce (S)	Kohlrabi (S,T)	Spinach (S)
Onion (S)	Lettuce (S,T)	Sw.Chard (S,T)
Pea (S)	Mustard (S)	
Radish (S)	Onion (S)	
Shallot (sets)	Parsnip (S)	
Turnip (S)	Pea (S)	
	Radish (S)	
	Shallot (sets)	
	Spinach (S)	**November**
	Sw.Chard (S,T)	Garlic (sets)
	Turnip (S)	Lettuce (S,T)
		Onion (sets)
		Radish (S)
		DECEMBER
		Artichoke, root
		Onion (sets)
		Rhubarb, root

- Use planting calendar for your climate.
- See: ***Planting times:*** https://ucanr.edu/sites/default/files/2023-05/384680.pdf
- Plant veggies that have similar watering requirements and growing times together. (e.g. "fruit bearing vs. leaf crops)
- Carefully consider water needs of crops you grow.

Planting methods to minimize water use



Planting in a "hex pattern" optimizes bed spacing—shades soil ad reduces water evaporation

- Proper spacing, use "in-bed" space charts
  - Optimize in bed spacing to shade soil and avoid evaporation
- Germinate seeds in small pots and transplant seedlings
- Use hexagonal planting method to create living mulch
- Weed regularly to prevent competition for water

Approximate In-bed spacing and days to maturity for common fall crops

Crop	Spacing	Maturity/days
Beans-bush	6"	48-60
Beets	4"	55-70
Broccoli	15"	55-70
Cabbage	18"	65-120
Carrots	Thin to 2-3"	120-150
Cauliflower	15"	90-110
Chard	9"	55-60
Collards	12"	60-85
Cucumber (slicing)	12" needs trellis	60-75

Crop	Spacing	Maturity/days
Garlic	4"	8-9 mo.
Kale	15"	70-80
Leaf lettuce	9"	30 days
Onions bunching	3" or less	50-60
Parsley	6-8"	70-90
Peas--bush	4" needs trellis	60-70
Radish	Thin to 2"	21-30
Spinach	5"	40-50
Zucchini	18"	50-60

Days to maturity are "from seed". Will vary according to temperature and sunlight.

Source: California Master Gardener Handbook; How to Grow More Vegetables (John Jeavons)

Soil improvement and creating living soil

- Increase soil organic matter to improve water holding capacity of soil
- Add compost—approx. 1” mixed into top 4” of soil
- Keep roots in the ground
- Use cover crops to increase organic matter, soil biology (beneficial microbes) and nutrients

Water effectively and efficiently

- Avoid using overhead sprinklers
- Use drip irrigation if possible—when rains come consider turning off watering system
- If hand watering, use adjustable nozzle that allows for "gentle rain" with on/off valve
- Water in the early morning or 2 hours before sunset
- Only water when plants need it—feel your soil down 4-6 inches
- Water slowly and deeply to avoid runoff and soil erosion
- Install rain barrel(s) to make use of free water

Protect the Soil!

- Avoid bare soil!
- Mulch between plants
- Use organic mulch—leaves, straw, pine straw, coconut coir
- Plant cover crops during "off season"
- Use shade net to cover garden beds between plantings

Cool weather cover crop mixes improve and protect soil and hold water

Protect the Soil—Mulch!

2-3" of straw mulch holds water in warmer months, keeps soil warm in cooler months and suppresses weeds

- Have plenty of organic mulch on hand
- Free from pesticides, herbicides
- Avoid colored purchased mulches
- Gathered or purchased
  - Straw (rice straw preferred)
  - Leaves (start saving them now)
  - Pine straw (needles)
  - Coconut coir
- Clean arborist chips can be used for fruit trees and other perennials

PREPARING FOR THE FALL EDIBLE GARDEN

Things to Consider

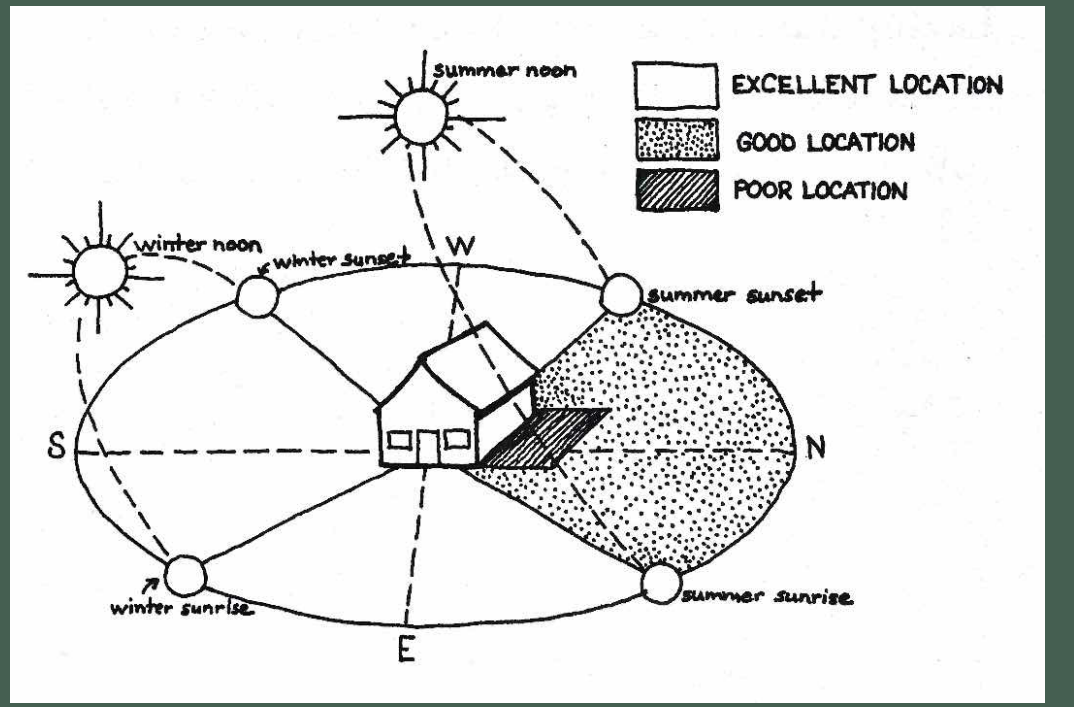
- Decide how much of edible garden you would like to have planted in fall-winter crops
- Consider the time you are willing to dedicate to your fall/winter garden
  - If this is your first fall garden—start small.
- Select crops you want to grow and get seeds germinating or find source of plant starts

Things to Consider

- Consider planting cover crops in any unused beds rather than leaving unplanted
- If any beds are left unplanted, keep weeded and mulched
- Make compost with summer crop residue, grass clippings, leaves, corn stalks, etc.

Things to Consider

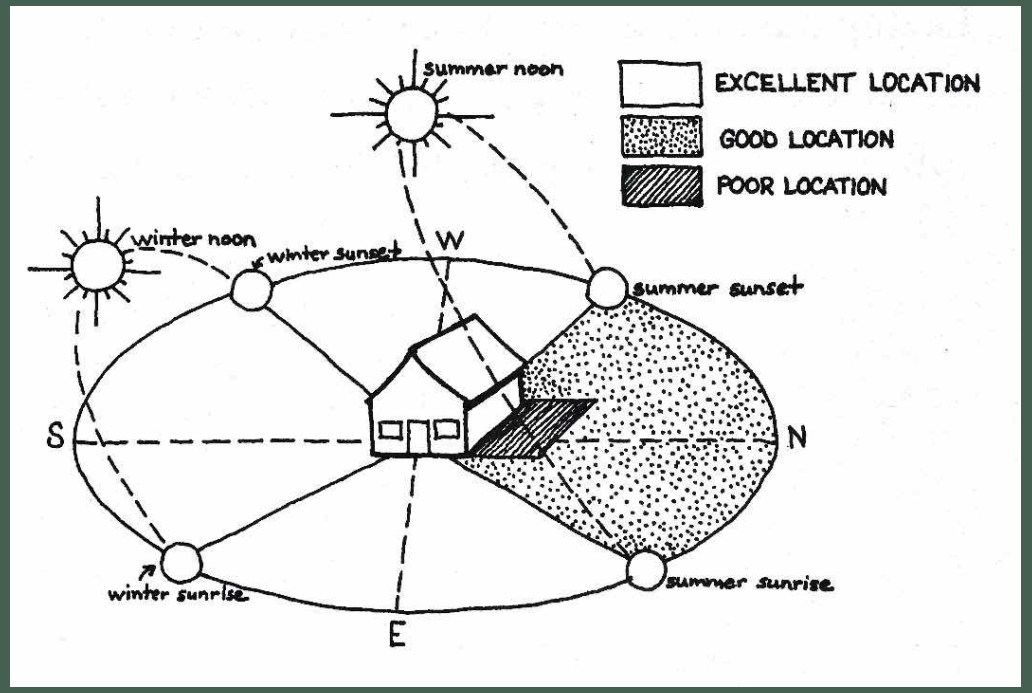
- Take into consideration day length during the fall and winter
  - Bay area day length in December is still about 9 hours. But this may not be enough with barriers to full sun exposure
- Examine shade issues that may arise in your garden as the sun becomes lower in the horizon.
  - Fences
  - Trees
  - Nearby houses and buildings



Things to Consider

Find the sunniest locations for your fall vegetables—preferably a southwest location

- Fruiting vegetables such as beans and squash require at least **6 hours** of full sunlight daily.
- Root vegetables require **4-6 hours** of direct sun per day
- Cool weather and leaf vegetables need **4 hours** of sunlight per day—many do well in partially shaded areas



Things to Consider

- Consider day time high and night time low temperature in the fall and winter.
- Cool weather crops planted in warm fall weather may need shade cloth at first
- Most cool season crops will survive down to 25° F.
  - Prolonged freezes may require floating row cover (e.g. Agribon)

Recently planted cabbages are covered with shade net for protection from early fall heat.

Things to Consider

- Plan on getting your fall crops in late August/early September so plants can get established during longer days and warmer temperatures.
- Plants will do better in cold weather if they've had an opportunity to be in the soil that has become gradually cooler.
- Fall veggies tend to be smaller and grow more slowly in the cooler weather.

Lacinato (Dino) kale seedlings started in August are ready to plant in garden

Planting strategy

- Sow root crop seeds in garden beds now
- Plant seeds of leaf crops (lettuce, kale, chard, spinach) in August for September planting
- Or locate source for cool weather crop seedlings
- Check seed packets and seed company websites for required growing conditions and days to maturity

Root crops grow best from direct sowing in rows. Plant carrots, beets, radishes in the same area of garden to conserve water while germinating

Garden Bed Preparation—Compost!

- Previously planted beds require minimal preparation for fall crops
- Remove crop debris from summer crops
- Loosen soil (do not turn) to 12”
- Apply ½-1” of good quality compost and rake into top 4” inches of soil

Garden Bed Preparation

Alfalfa meal, kelp and other organic fertilizers can be added as needed for soil conditions and plant needs before planting.

- Apply organic fertilizer for "heavy feeder" crops such as broccoli, cabbage
- Legumes, lettuces and other leaf crops may not need additional fertilizer if the bed was fertilized in the spring
- Note: avoid over fertilizing to prevent fast growing, giant water consuming plants!

FALL PLANT SELECTION

Home grown produce for fall and winter

Edibles for the Fall Garden

- Cool weather vegetable crops such as leaf crops, brassica, root crops and herbs thrive in the fall winter garden.
- Legumes such as peas, green beans, fava beans
- Fast growing cool weather varieties of zucchini and cucumber can often be grown in the fall garden

Edibles for the Fall Garden

Leaf crops:

- Continually harvest—chard, spinach, kale, collards, lettuce, arugula and mustard greens
- Succession planting of faster growing crops such as lettuce, arugula and mustard greens will extend your yield into the winter months. Plant every two-three weeks if you have space.

Gourmet Lettuce mix can be continually harvested over several weeks

Edibles for the Fall Garden

Leaf crops:

- Leaf crops require less sunlight and can tolerate some shade—especially lettuce
- Lettuce and arugula may need shade net on warmer fall days
  - Lettuce does not do well with direct sun and heat
  - Arugula can become bitter in heat

Arugula is a fast growing nutritious green that is ideal for the fall garden

Edibles for the Fall Garden

Leaf crops:

- Chard and spinach may need row cover in early fall to protect from leaf miner infestation
- After the temperatures cool, the row cover can be removed
- Chard plants often overwinter to give leaves until early spring
- Spinach has a shorter life span

Edibles for the Fall Garden

Leaf crops:

- Kale
  - Several varieties: curly, Lacinato (Dino), Red Russian and Siberian
  - Very pest resistant
  - Overwinters very well
- Collard Greens
  - Same family as kale (brassica)
  - Annual and perennial varieties (e.g. tree collards)
  - Makes a great addition to edible greens—very nutritious, easily used as wraps
  - Also pest resistant and overwinters well

Edibles for the Fall Garden

Brassica

- Broccoli, Gai Lan, Cabbage, Cauliflower
- Note: kale, collards, arugula, radishes, turnips and rutabagas are also part of the brassica family.
- The "single harvest" brassica do well in cooler climates, but are less water wise and more pest prone.
- All brassica are prone to cabbage looper and cabbage worm and aphids in warmer months

Edibles for the Fall Garden

Brassica

- Broccoli
  - Plant from seedlings in mid-late August for fall and winter harvest
  - Recommend variety that has grows side shoots (DiCicco) for continued harvest and water conservation
  - DiCicco broccoli is an heirloom broccoli that will begin producing broccoli heads in 55-70 days

Edibles for the Fall Garden

Brassica

- Broccoli
  - After center head is harvested it will continue to produce many smaller "side shoots" harvested as "baby broccoli" all fall and winter long.
  - Side shoots will continue to produce as long as the flowerets do not actually produce yellow flowers.

DiCicco broccoli side shoots can be harvested all winter long

Edibles for the Fall Garden

Brassica

- Gai Lan or Kai Lan (Chinese broccoli)
  - Transplant from seedlings in late summer/early fall
  - Fast growing cool weather brassica
  - Stems, leaves and flower heads are edible
  - Easy to grow for continuous harvest throughout fall and into winter
  - Taste similar to broccoli—although a bit more bitter

Edibles for the Fall Garden

Brassica

- Cabbage
  - Several varieties-–red, green, golden
  - Smaller sizes better for fall planting and smaller gardens
  - Plant from seedlings in late August
  - Single harvest crop
    - Cabbages store very well
    - Densely packed leaves give considerable food yield

Golden Acre and Red Express Cabbages

Edibles for the Fall Garden

- Other brassica worth trying in the fall garden:
  - cauliflower
  - brussels sprouts
  - kohlrabi
  - savoy cabbage
  - tatsoi

Edibles for the Fall Garden

Root Crops:

- Carrots, beets, radishes, rutabagas, turnips
- Root crops do best when direct sown into soil
- Radishes are fast growing and mature in about 4 weeks. You'll have time for a couple of crops of radishes.

Edibles for the Fall Garden

Root Crops:

- Carrots, beets, rutabagas and turnips take about 9 weeks to mature
- Beet greens can be harvested as the roots continue to mature.
- Like chard, beets are prone to leaf miner—cover with Agribon until cool weather arrives

Red beets and golden beets add color to fall root crops

Edibles for the Fall Garden

Alliums:

- **Bunching onions** (aka scallions, green onions)
  - Do not make a bulb
  - Can be grown year round
  - Purchase as seedlings or flat now to transplant in several weeks
  - Can also be direct sown into garden bed
  - Plant 1-2 inches apart
  - Harvest throughout fall winter season

Edibles for the Fall Garden

Alliums:

- **Garlic**
  - Purchase “seed garlic” from reliable source
  - Plant in late fall (Oct-Nov) for summer harvest
  - If you’ve never grown garlic see Peaceful Valley Farm Supply for articles and videos (groworganic.com)

Edibles for the Fall Garden

Alliums:

- **Chives**
  - Plant from seed now
  - Or buy as seedlings in herb section of nursery
  - Grow very well in pots
  - Great addition to winter herb garden

Edibles for the Fall Garden

Super Sugar Snap Peas

Legumes:

- **Peas**
  - Sugar snap peas, snow peas or shelling peas are all cool weather legumes
  - Best grown in spring and fall
  - Can be direct sown or transplanted
  - Most will need some kind of trellising

Edibles for the Fall Garden

Provider bush beans are fast growing and produce abundantly

Legumes:

- **Green beans**
  - Fast growing bush beans can be planted in August for fall harvest
  - Avoid pole beans for fall planting
  - Direct sow or flat and transplant

Edibles for the Fall Garden

Legumes:

- Fava beans
  - Can be grown for edible beans or part of fall cover crop strategy
  - Mature beans must be shelled and lightly steamed to remove seed covering
  - A little bit of work—but very delicious

Edibles for the Fall Garden

- Cool weather varieties of cucumbers and zucchini
  - Marketmore cucumber
  - Dark Green or Black Beauty zucchini
  - Are fast growing and do well in cool weather
  - But get them in soon!

Edibles for the Fall Garden

Plant multiple parsley plants for winter soups and holiday cooking

Herbs

- Grow parsley, thyme, sage, rosemary, marjoram, oregano
- Purchase as seedlings from local nursery
- Plant in large pots or garden bed for fresh herbs all winter
- If this is your first fall garden—planting herbs is a perfect way to get started.
- Herbs are hardy, easy to grow and are naturally “water wise”

QUESTIONS?

COVER CROPS

For Soil Health and Water Conservation

Cover crops

- Anything that is planted to enhance fertility and preserve the soil structure can be called a cover crop
- Cover crops can be planted separately or as mixes
- Cover crop mixes include nitrogen fixing legumes and carbon producing grains
- Cover crops can include wildflowers and roots crops such as daikon radish

Cool weather cover crop mix that includes legumes and grains

Cover crops

The many functions of cover crops:

- Cover crops protect soil in “off season”
- Valuable component of crop rotation practice
- Improve soil structure and fertility
- Prevent soil erosion
- Suppress invasive weeds
- Hold water in soil
- Maintain microbial life in soil

Edible Legume Cover Crop Mix

Cover crops

- Legumes (fava beans and peas) fix nitrogen into soil and produce biomass
- Grains crow organic matter into soil
- Roots (daikon radish) break up heavy clay soils
- Flowers attract beneficial insects
- Food source for insects and birds
- Important component of sustainable and restorative gardening and farming practices

Edible Legume Cover Crop Mix

Cover crops

- Cover crops are typically planted at the end of the main growing season (fall) and grown over the winter.
- In early spring they can be used as
  - **green manure**—cut down, dug in place and left in place for at least 30 days before planting
  - **compost crops**—cut down and used to make compost

Austrian Winter pea will produce edible pea pods in the spring

Cover Crops

Fava beans

- Plant in the fall as a winter cover crop
- Fava plants have prominent nitrogen fixing nodules on roots
- Cut down when flowers are at 10-15% for maximum nitrogen fixing
- Let some plants grow mature beans to eat
- Fava bean stalks have the ideal carbon/nitrogen ratio for your compost pile

Cover Crops

Other Legumes—nitrogen fixers
- Vetch
- "Biomaster peas"
- Austrian winter peas
- Bell beans (small fava bean variety)
- Alfalfa
- Clovers

- All can be grown separately or as part of a cover crop mix
- All germinate well in cool weather
- All produce high nitrogen biomass for soil improvement and compost piles

Vetch produces flowers that attract beneficial insects and bees

Cover Crops

Grains

- Grains can be planted for soil improvement
  - Long root system literally crows carbon into your soil
- Mature stalks add high carbon biomass to your compost piles
- Grains include—winter wheat, oats, barley, triticale and rye
- Many cool weather cover crop mixes contain grains

You probably won't get enough to make bread, though.

Cover Crops

- Use “cool weather” cover crop mixes for fall planting
  - Buy prepared seed mix or mix your own
- Or plant separate beds of different cover crops—depending on the needs of the soil
- Small seeds such as vetch, Austrian pea, mustard and grains are “broadcast” on to soil and chopped in with rake or hoe
- Large fava seeds or bell beans should be direct sown—1/2- 1” deep, 12” apart

Vetch produces flowers that attract beneficial insects and bees

Cover Crops

- Cover crops can be planted last in your fall garden.
- Cool weather cover crops can germinate in temperatures down in 40-50° F
- After planting seeds, hand water daily
- Cover the seeds with a shade net until crop germinates
  - Shade net will hold in water
  - Protect from birds
- Once cover crop has established and the rains have started—little watering is necessary
- Weed cover crop beds as needed to prevent competition

Vetch produces flowers that attract beneficial insects and bees

Cover Crops for Sustainability

The 50% rule for sustainability

- Producing your own compost will reduce the need for purchased compost and organic fertilizers over time.
- If your goal is to produce crops for your compost—
  - approximately 50% of the crops you grow in your garden should be ***"compost crops"***
- Grow half high nitrogen and half high carbon crops

Winter rye makes a great cover crop either alone or as part of a mix.

Most Importantly--Have Fun!

Thank you!

Come visit Pacifica Gardens to learn more…

Visit us at www.pacifica-gardens.org

Volunteer to learn and help grow food to support our community

Contact me:
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RESOURCES

Resources

- ***California Master Gardener Handbook***; UC Agriculture and Natural Resources
- ***How to Grow More Vegetables***…;John Jeavons
- ***The Sustainable Vegetable Garden***; John Jeavons and Carol Cox
- ***Teaming with Microbes: A Gardener's Guide to the Soil Food Web***; Jeff Lowenfels and Wayne Lewis
- ***The Organic Gardener's Handbook of Natural Insect and Disease Control***
- ***Gaia's Garden: A Guide to Home-Scale Permaculture;*** Toby Hemenway
- ***Peaceful Valley Farm Supply*** (groworganic.com)
- ***Territorial Seed Company*** (territorialseed.com)
- ***Seed Saver's Exchange*** (seedsavers.org)
- ***American Meadows*** (americanmeadows.com)
- ***Renee's Garden*** (reneesgarden.com)
- Countless YouTube videos….

Resources

- ***Vegetable Gardening with less water:*** *https://www.youtube.com/watch?v=YftVCS0xEX8&t=18s*
- ***Planting times:*** *https://ucanr.edu/sites/default/files/2023-05/384680.pdf*
- *Vegetable gardening basics: https://ucanr.edu/statewide-program/uc-master-gardener-program/edible-gardening*
- *https://ucanr.edu/site/uc-master-gardeners-santa-clara-county/vegetable-gardening-basics*

COMPOST

Creating Your Own "Black Gold"
A Primer

Growing your soil

- Composting in your backyard garden is ***the #1 thing*** that you can do to:
  - Improve your soil structure and fertility
  - Grow healthy vegetables
  - ***Save water*** in your garden

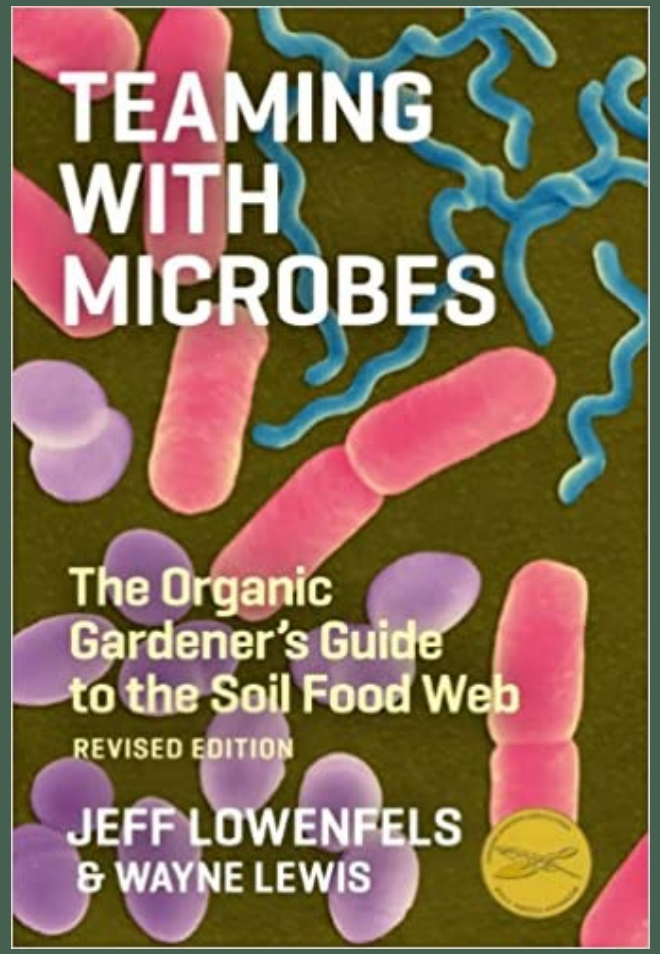
Use Compost not chemicals!

- Good compost provides nitrogen and carbon (sugars and carbohydrates) and other nutrients to grow healthy organic vegetables.
- Compost reduces need for chemical fertilizers
- Compost improves soil—which grows healthy plants and reduces pests and diseases.

Compost saves water!

What exactly is compost?

- Living compost is teaming with bacteria, fungi, protozoa, nematodes and earthworms
- All of which decompose organic matter, improve soil structure, maintain soil pH, provide nutrients and ward off plant disease
- For more information on living compost and the soil food web see ***Teaming with Microbes***



How to Make a Compost Pile

- You'll need:
  - A container—3-4 feet square
  - Equal parts "browns and greens"
  - A compost fork or digging fork
  - A compost thermometer (if desired)
  - Water
- "Composters" can be made from wooden pallets or wood slats, wire mesh or purchased plastic models

My personal favorite are "stackable" made from either wood or plastic

How to Make a Compost Pile

- For ease, place your composter in a location so that you will be able to "turn" the pile simply by shifting it to one side.
- There are elaborate composters—but they are not necessary.

Smith & Hawken's BioStack Composter is made from recycled plastic and very durable.

How to Make a Compost Pile

- "Greens" are nitrogen rich materials such as
  - Lawn clippings and green leaves
  - Vegetable crop "debris"
  - Vegetable kitchen scraps
  - Cover crops such as fava and other legumes
  - Coffee grounds
- "Browns" are carbon rich mature plants such
  - Corn stalks
  - Sunflower stocks
  - Straw
  - Fall leaves
  - Tree trimmings

How to Make a Compost Pile

- Compost needs:
  - Water
  - Air-–oxygen
  - Materials—browns and greens
    - If you have time/energy, cut up your materials into smaller pieces (4-6 inches)
    - The smaller the pieces, the faster they will decompose

How to Make a Compost Pile

- Building the pile
  - Put a 3-4 inch layer of wooden sticks or chips on the bottom to help create air space at the bottom of the pile
  - Alternately layer 4-6 inches of browns and greens
  - Water between each layer
  - Build your pile so it is at least 3ft square.
  - End with a brown layer
  - Cover to keep in moisture and prevent critters from visiting

Compost pile made from wire mesh

How to Make a Compost Pile

- A properly made compost pile should heat up to 135° F in 24-72 hours
- Hopefully the center of the pile will heat up to 150° F in three days—try to keep here for a few days as the "thermophilic" stage is where weed seeds and pathogens are killed.
- Never let your pile get over 155° (carbon burns off). If your pile gets too hot, turn it and water if dry.

Side by side bins make turning a pile simple

How to Make a Compost Pile

- The pile should be turned 2-3 times during the maturation stage. Try to keep temperature between 104-131° until all the material is decomposed. It usually takes 2-3 months.
- Water pile when turning and make sure it stays moist
- Compost is complete when organic matter is a dark rich color that smells like a forest floor.