Fall & Winter Vegetables

UC Master Gardeners
Napa County

August 18, 2018

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Workshop Overview

- Summer vs. Fall
  - Weather, temperature, light
- Cool Season vs. Warm Season Crops
  - Hands-on exercise
- Planting & Harvesting
  - Crop Rotation
  - Hands-on exercise
- Taking Care of the Garden
  - Clean equipment
  - Irrigation
  - Fertilizers
  - Soil Amendments, compost, cover crops
- Pests & Diseases
- Q & A
- Transplanting

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Let's Get Started

- Napa Climate Zones/Weather
- Microclimates/Assessing Your Space
- Temperature/Precipitation

- Sunlight & Sun Tracking

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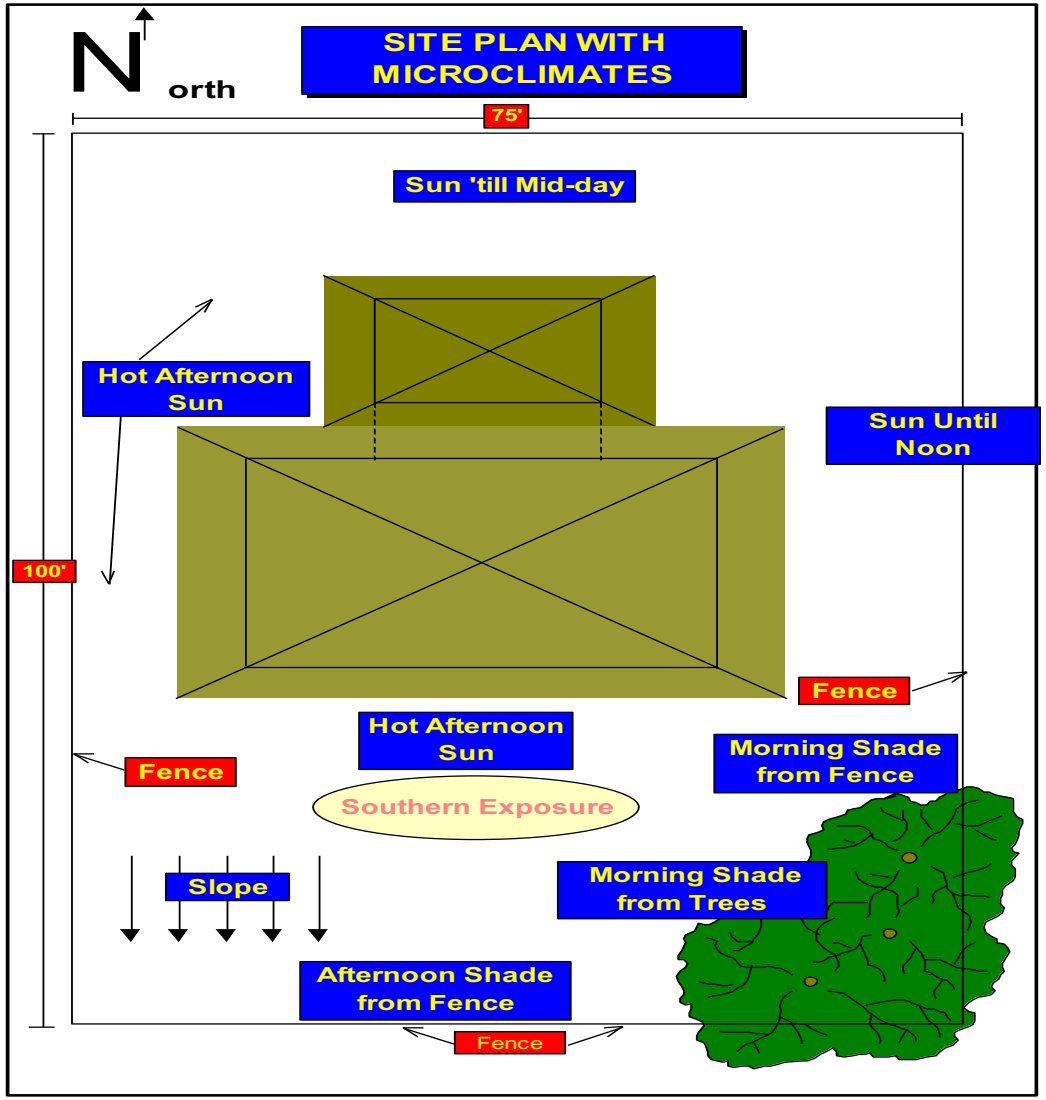
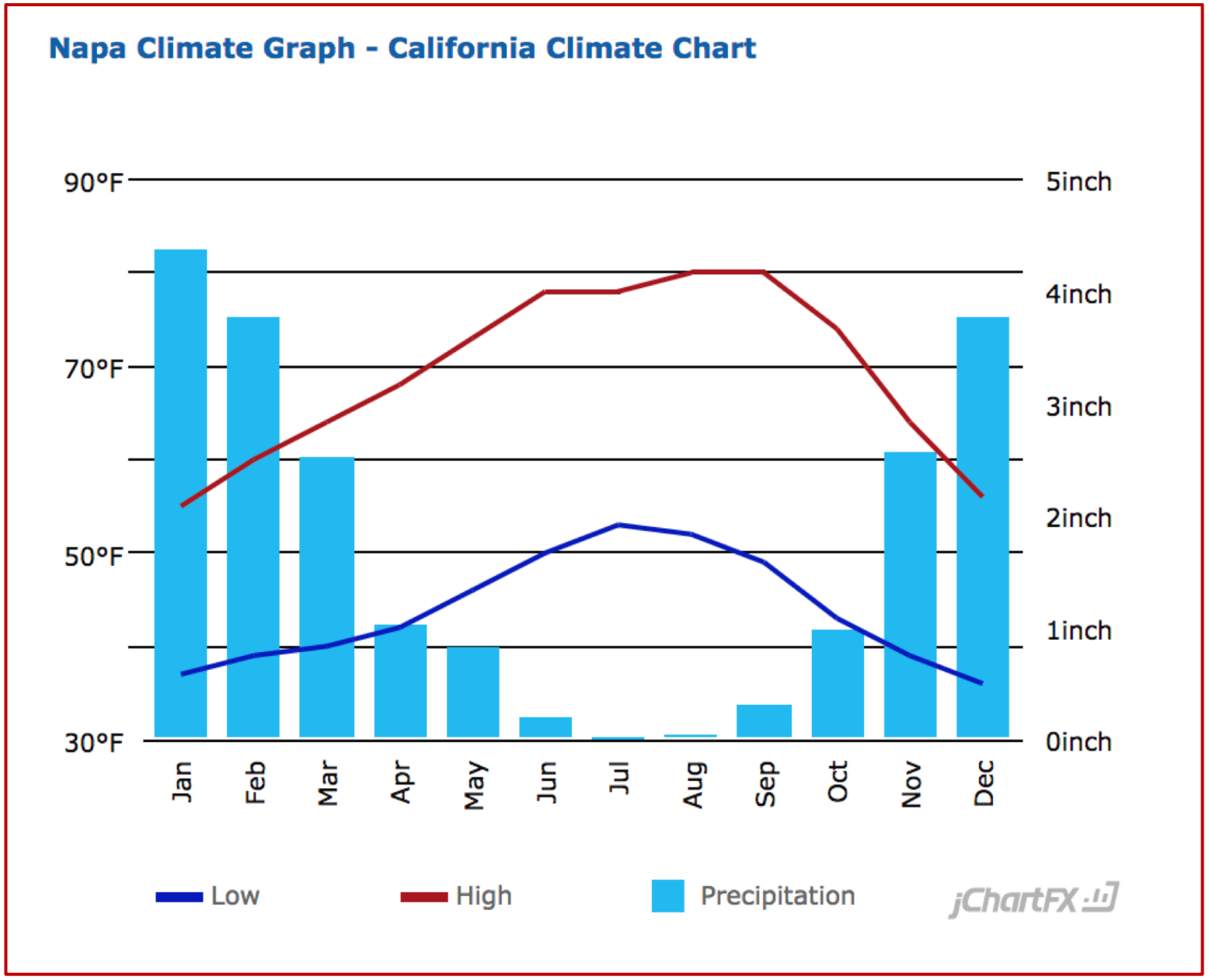
Microclimates



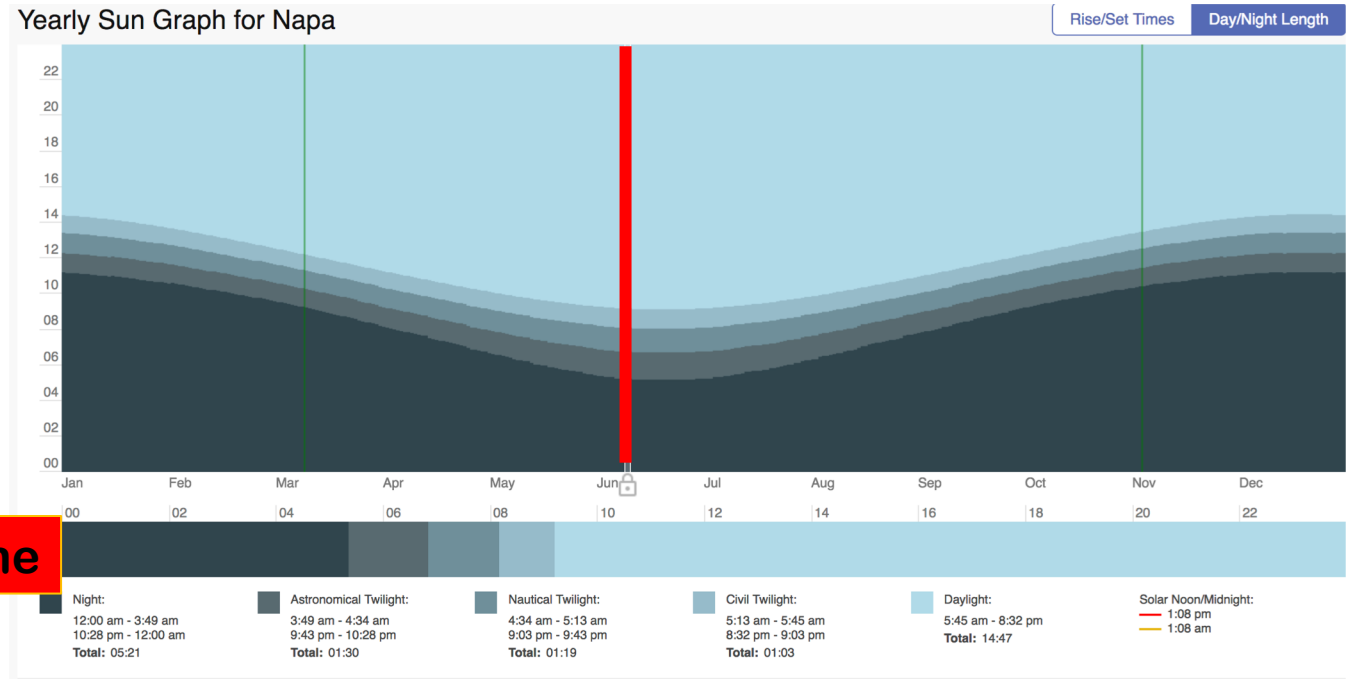
- Temperature
- Rainfall
- Sunlight
- Wind
- Elevation
- Topography
- Frost
- Exposure
- Shade
- Buildings
- Fences
- Paved areas
- Overhangs
- Drainage
- Soil

Microclimate is the climatic condition specific to a small area that is different from its surrounding conditions.

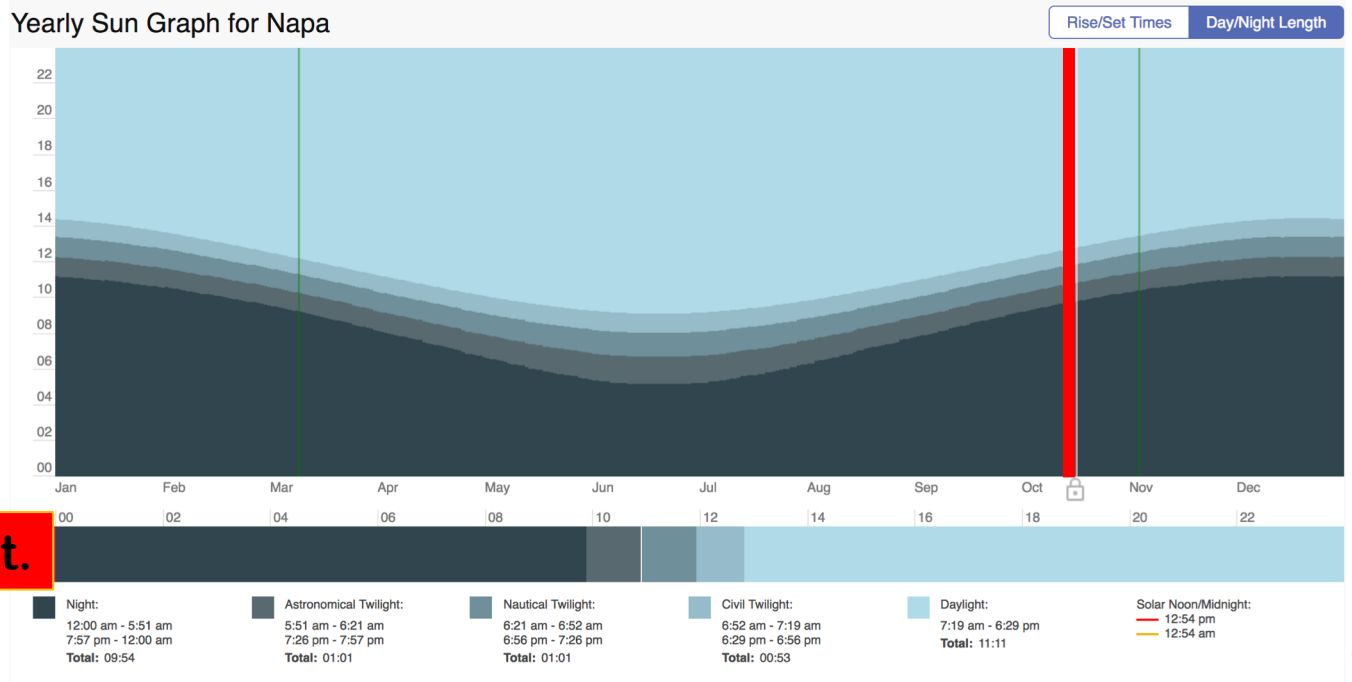
Napa County's Annual Temperature & Precipitation Ranges



Warm season veggies best between 65-95 degrees Cool Season veggies best between 55-75 degrees



June

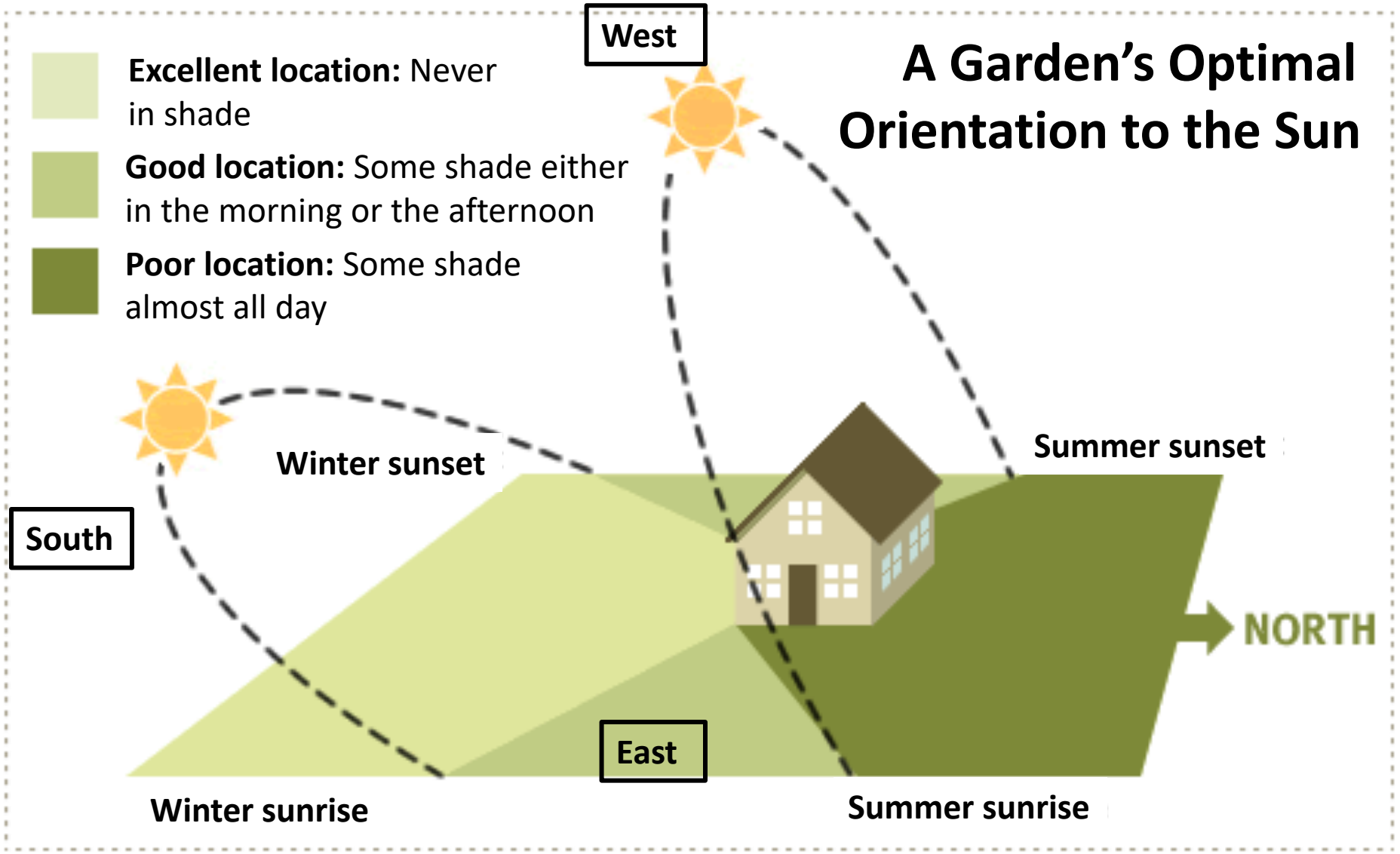


Oct.

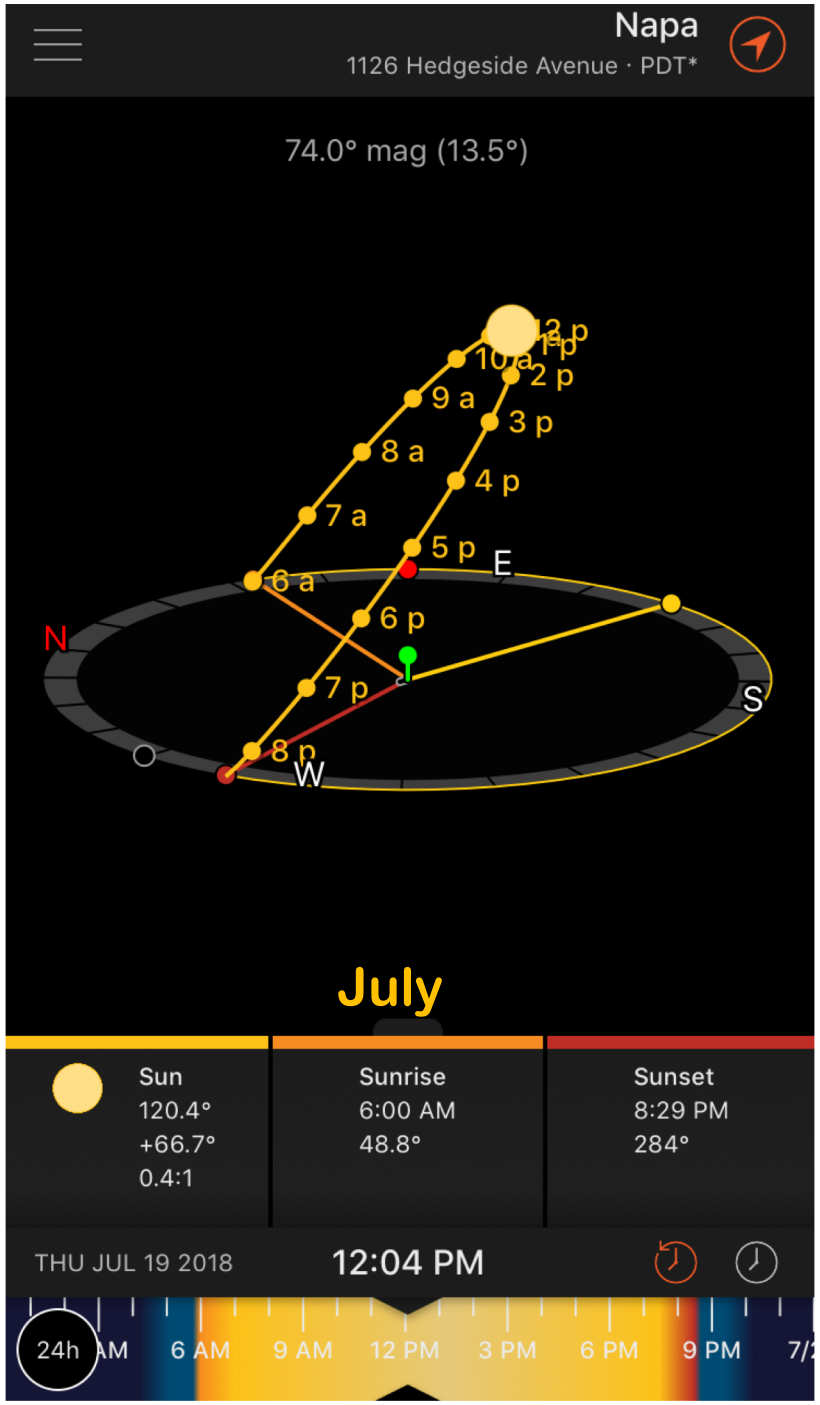
Napa County's Yearly Sun Graph

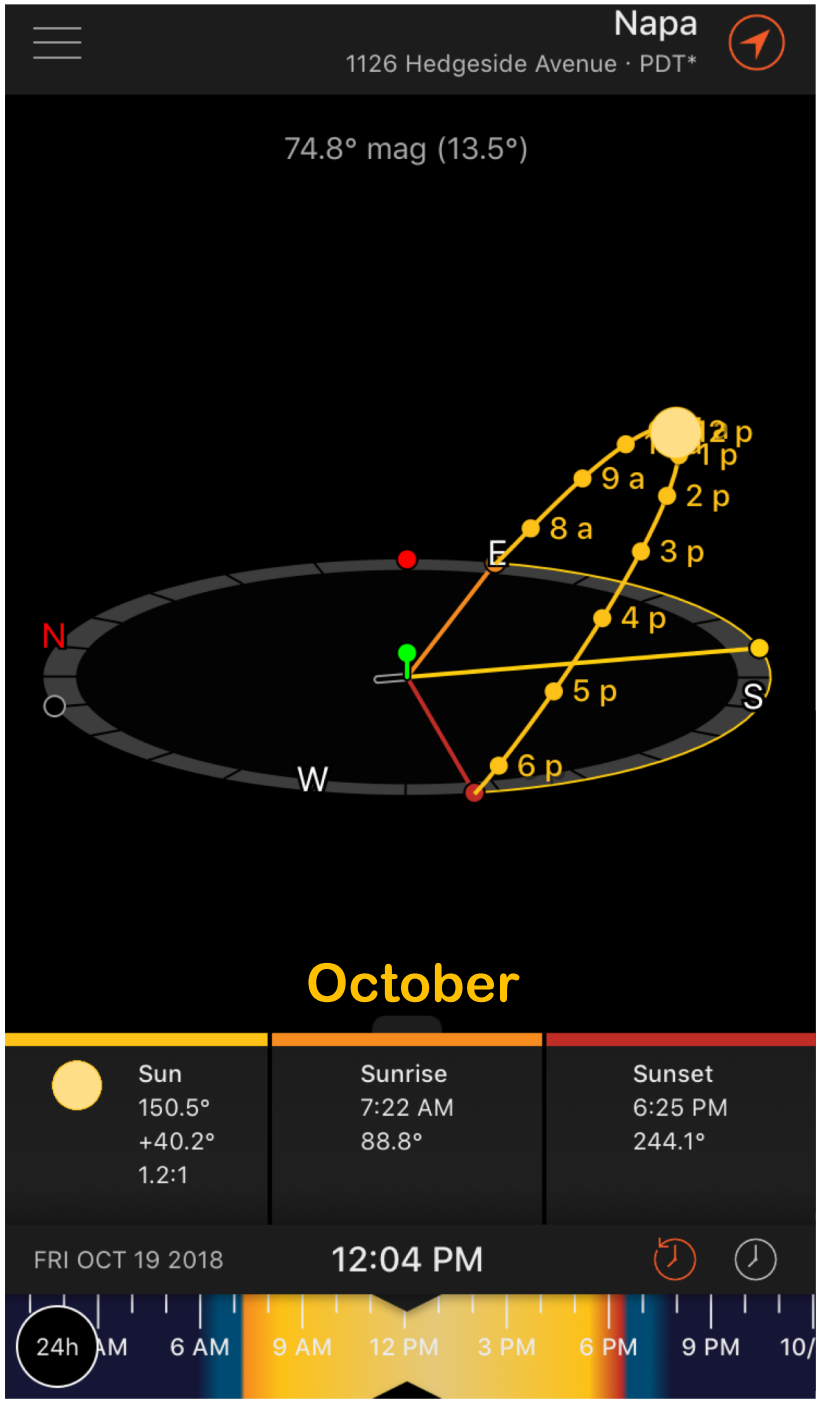
Not only are there fewer sun hours, but the sun is less direct, thus **less intense** since the sun is further away.

Sunlight - Summer vs. Winter



Sun Surveyor





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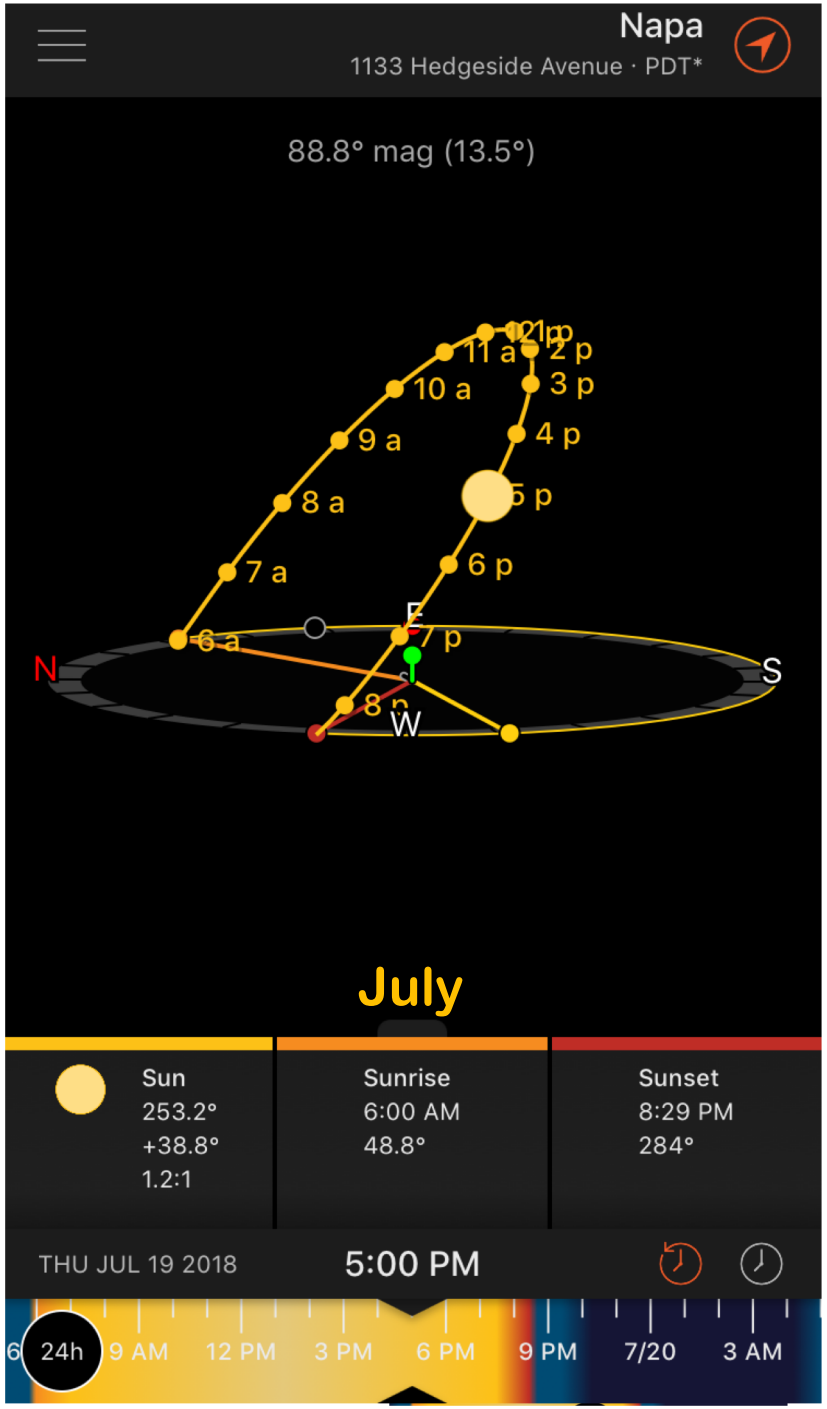

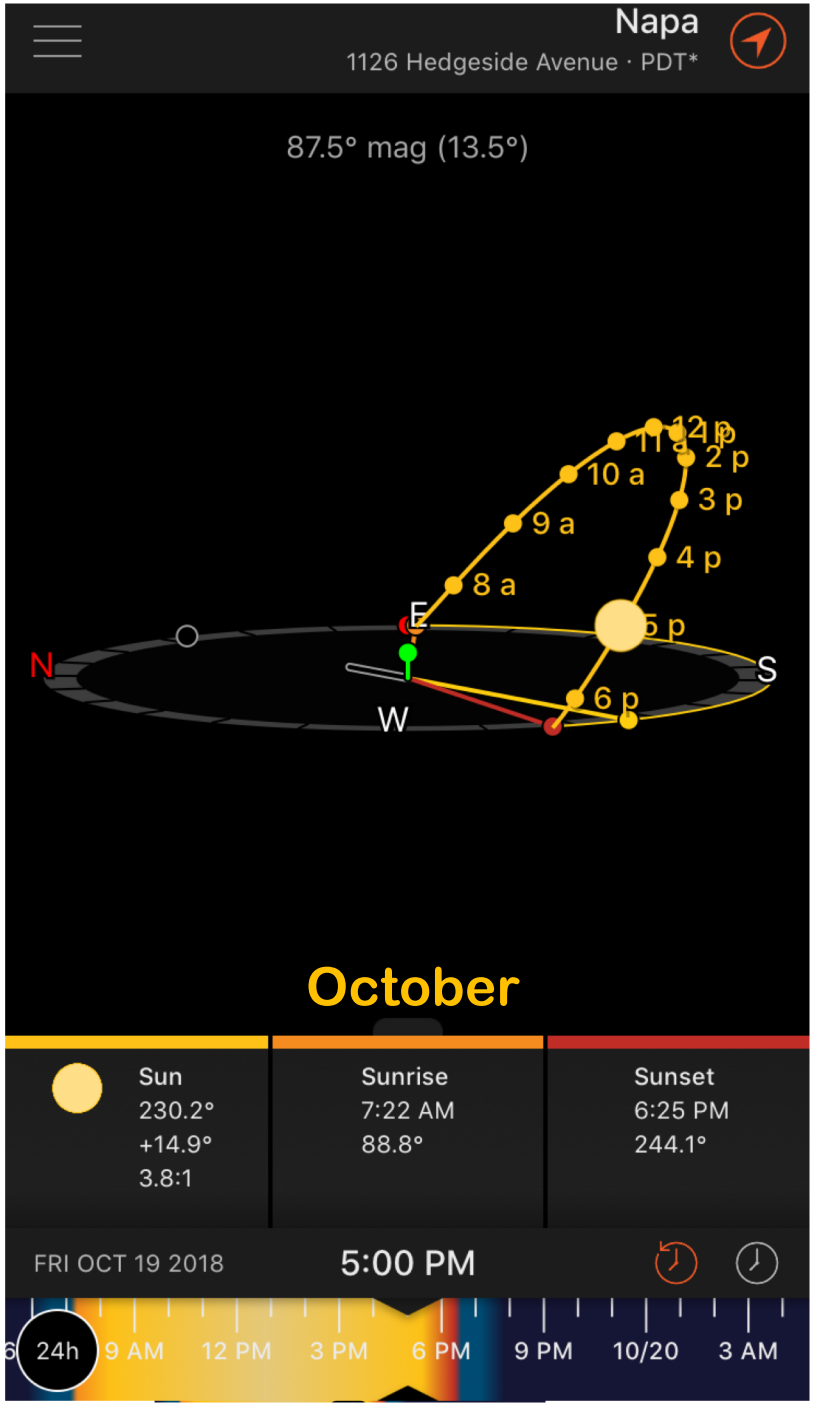

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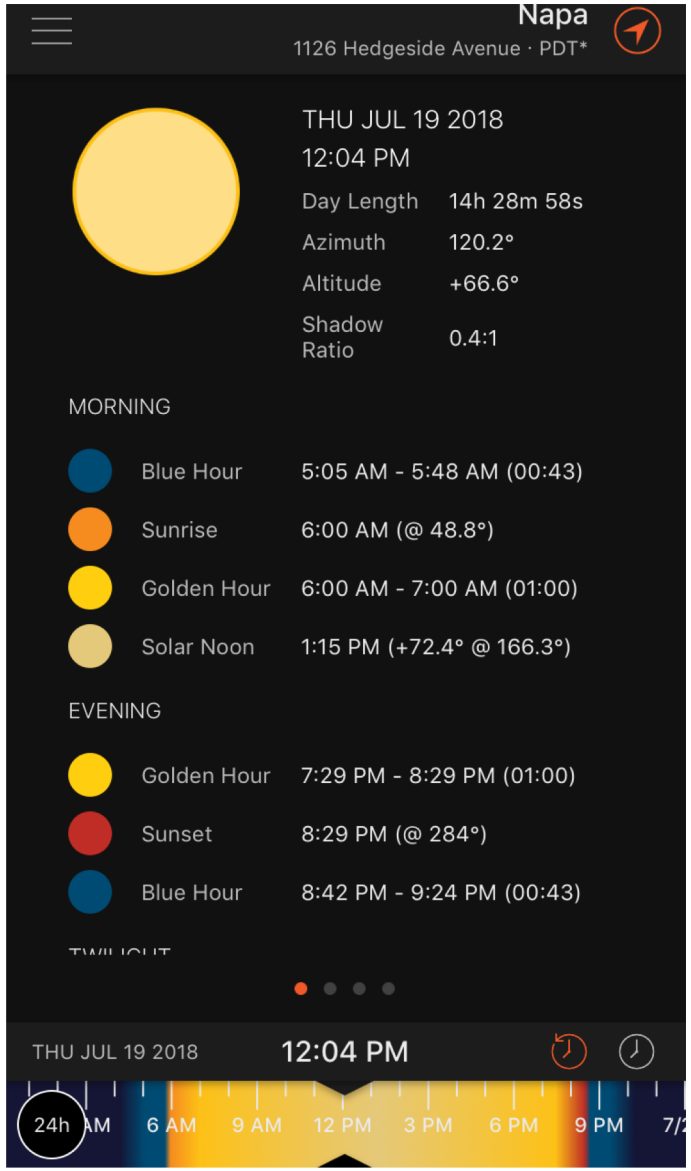
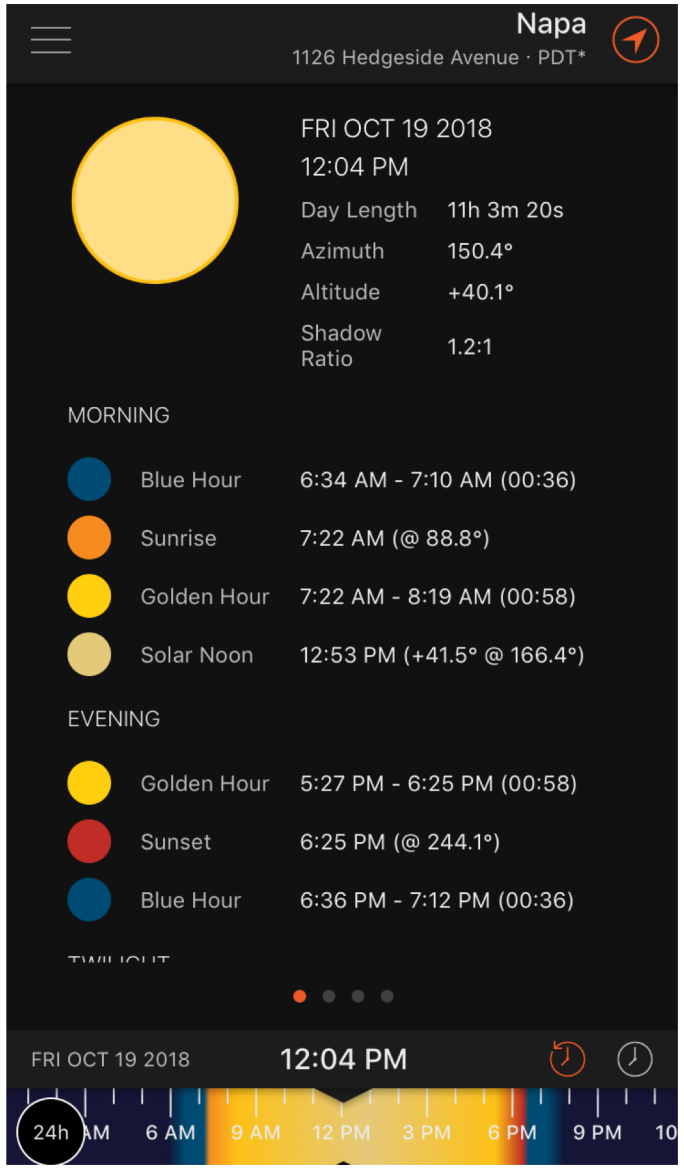


July



October

Cool Season Crops

- Grow best in day time temperature range of 55 to 75 degrees Fahrenheit
- Tolerate some short-term frost when mature
- Some are improved by frost
- “Everything but fruits”
- Seeds can germinate in cooler soils
- Excess soil temperatures reduce germination rate

Warm Season Crops

- Grow best at 65 to 95 degrees Fahrenheit
- Are injured or killed by frost
- Typically fruits (also beans, corn)
- Seeds need warmer temperatures to germinate

EXERCISE: Seed Package Sorting

As a group at your table, divide the stack of seed packets into cool season and warm season veggies

Planting & Harvesting Schedules

Who?

What?

When?

Where?

How?

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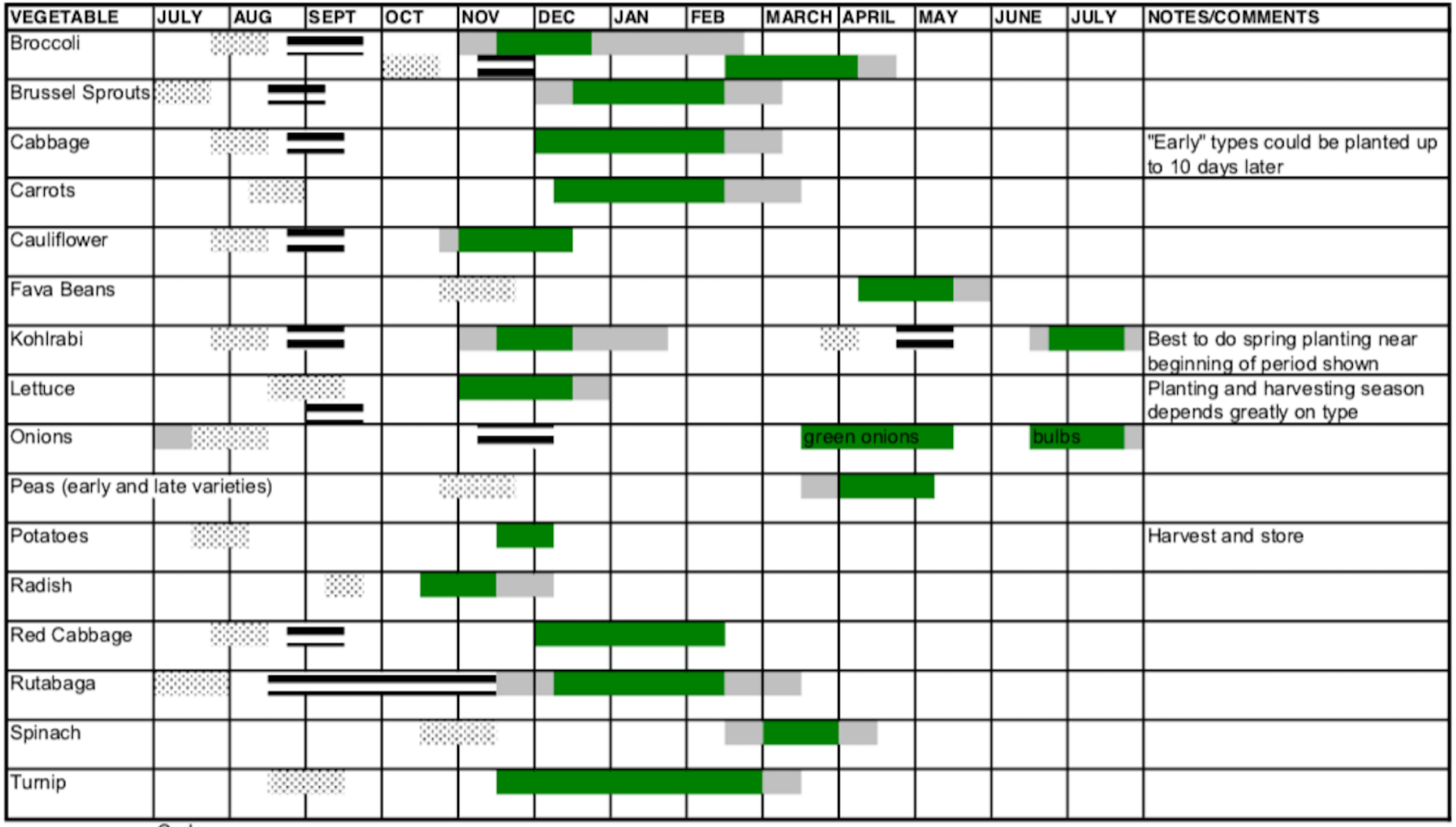
Napa County

HEALTHY GARDEN TIPS

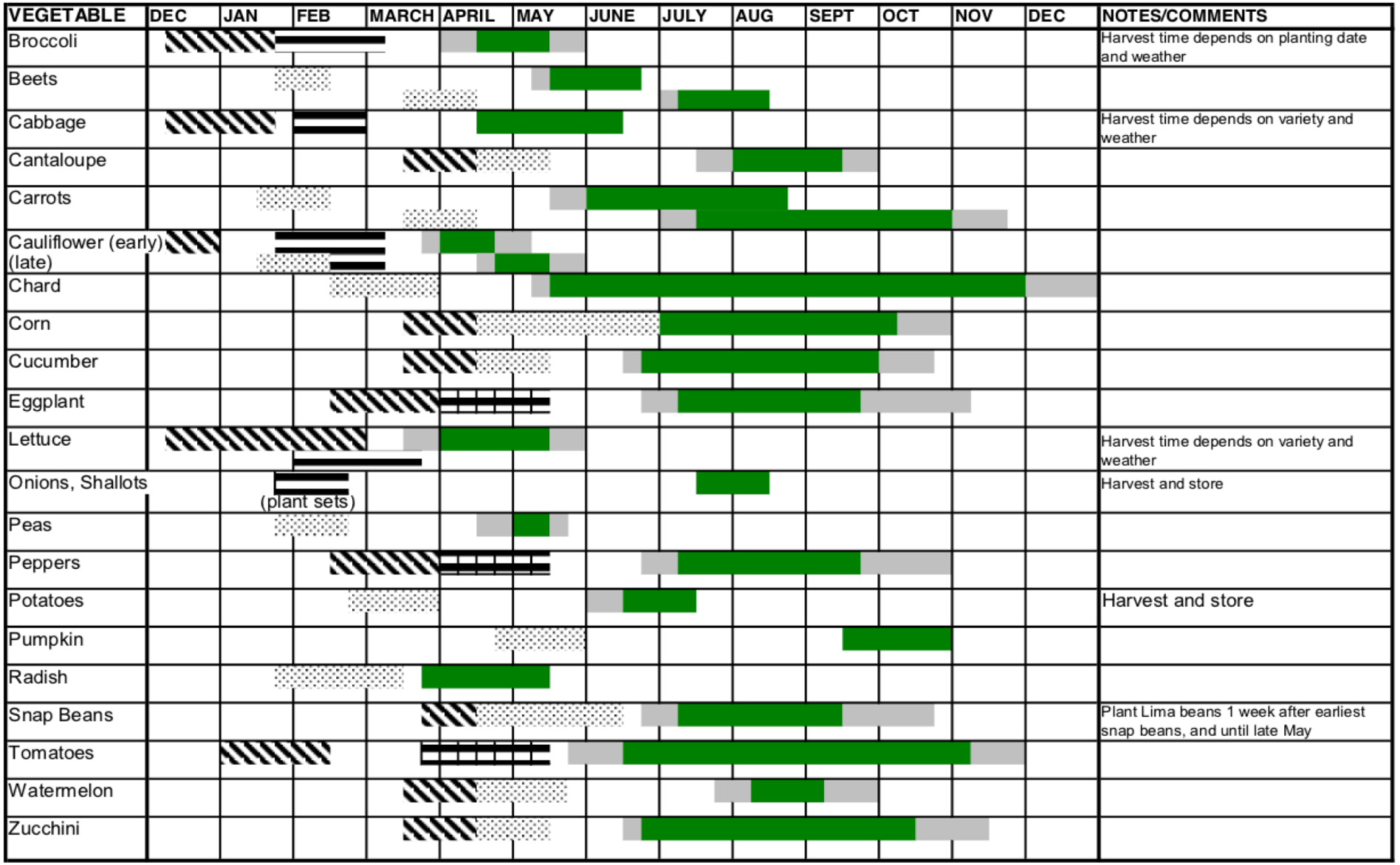
Website: napamg/ucanr.edu
Phone: 707-253-4221

SUMMER/FALL VEGETABLE PLANTING GUIDE FOR NAPA COUNTY

(From Robert F. Norris, Botany Dept. U.C.D, Prepared 10/98)



WINTER/SPRING VEGETABLE PLANTING GUIDE FOR NAPA COUNTY



VEGETABLE	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	NOTES/COMMENTS
Broccoli														Harvest time depends on planting date and weather
Beets														
Cabbage														Harvest time depends on variety and weather
Cantaloupe														
Carrots														
Cauliflower (early) (late)														
Chard														
Corn														
Cucumber														
Eggplant														
Lettuce														Harvest time depends on variety and weather
Onions, Shallots (plant sets)														Harvest and store
Peas														
Peppers														
Potatoes														Harvest and store
Pumpkin														
Radish														
Snap Beans														Plant Lima beans 1 week after earliest snap beans, and until late May
Tomatoes														
Watermelon														
Zucchini														

Code: Plant seeds; Plant seedlings; Harvest; Range of season; Plant seeds indoors/in greenhouse

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Strategies for timing the harvest

- Plant in July/August for fall harvest.
- Plant in August/September for “standing” harvest through the winter.
- Plant late (August/September/October) for harvest next spring.

Finding Space while Summer Plants are still producing

- Plant under or between summer crops
- Plant in containers
- Sacrifice a portion of summer crops
- Use vertical supports for trailing vines
- Start seedlings indoors for later transplant to garden (not appropriate for all vegetables)

Going vertical

Combining Nitrogen fixer with Nitrogen user

Lettuce Seed Packet

The Chas. C. Hart Seed Co.
304 Main St, Wethersfield, CT 06109

0 23497 11189 9

LETTUCE

HART'S SPECIAL MIX

Pick when young 3-4 weeks

This mix of lettuce favorites is usually harvested young and mixed for salads. Can also be separated after sprouting and transplanted to grow to maturity (approximately 40 - 50 days).

SOWING... Plant seed outdoors as soon as ground can be worked. Plant in rows 4 to 6 inches apart spacing seeds thinly in the row. Can also be broadcast thinly in a section of the garden. Cover with 1/4 inch of fine soil well pressed down. Keep soil moist until the seeds start to grow.

GERMINATION... Germinates in 7 to 14 days depending on soil and temperature conditions.

HARVESTING... Using scissors, snip the young leaves off about 1/2 inch above the soil line. For a continuous supply of lettuce throughout the summer, plant Hart's special mix each week.

REMARKS... Plant enough each planting to last about a week at harvest time. If you like salad, start with about 5 feet of row and adjust each planting as needed. This mild mix contains 20% Lettuce, Black Seeded Simpson, 20% Lettuce, Green Salad Bowl, 20% Lettuce, Oakleaf, 20% Lettuce, Red Salad Bowl, and 20% Lettuce, Romaine.

GE Free

All our seed is untreated
& produced by traditional methods.
For more information www.hartseed.com

Kale Seed Packet

KALE

You can't beat Kale if you are looking for tasty greens with high Vitamin and mineral content. The leaves are sweet, tender and crunchy especially when harvested after exposure to cool frosty weather. Enjoy greens boiled, steamed, stir fried or as a fresh addition to salads and sandwiches.

Planting Depth	Seed Spacing	Spacing Between Rows	Days to Germination	Spacing After Thinning	Days to Maturity
¼" to ½"	2"	2'	5 to 14	12" to 18"	55 to 70

When and where to plant: Select a sunny a location and sow seed in the spring as soon as the ground can be worked. Plant again in late July and August for fall and winter harvest. For best results, loosen soil with spade or fork, fertilize and smooth with rake. Firm soil over seed and keep moist.
Care: Keep soil moist, weed free and feed every 4 to 6 weeks.
Harvesting: Pick youngest leaves for fresh use in salads and sandwiches or Harvest the tender fully grown leaves starting from the bottom of the plant.
Health Note: A very rich source of calcium, Iron and vitamins A and C.

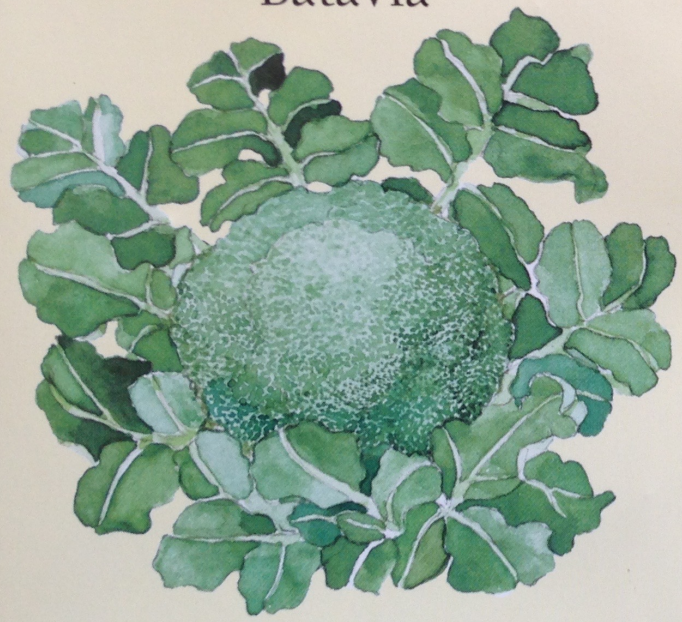
Strategies for extending the harvest

- Plant varieties that have a long harvest period (kale vs kohlrabi).
- Plant varieties with different maturity dates (broccoli ready in 45 days vs 75 days).
- Succession plant the same crop (plant carrots at intervals).
- Plant seeds and plants at the same time (lettuce in August; Asian greens in February).

Renee's Garden

ORGANIC USDA ORGANIC SEEDS

Early Heading Broccoli
Batavia



Early & vigorous new variety for vitamin-rich, big tasty heads & extended side shoot harvests.

Renee's Garden

Long Harvest Broccoli
All Season Blend

A blend of early, mid and late-maturing varieties for extended harvesting.

Crop Rotation

- Balance soil fertility
  - Heavy feeders (corn, tomatoes, etc.) vs Light feeders (root crops and herbs)
  - Nitrogen fixers (peas, beans, other legumes) vs heavy Nitrogen consumers (tomatoes, leafy greens)
- Reduce soil-borne diseases
- Interrupt invertebrate pest life cycles

Crop Rotation by Families

Warm Season

- Cucurbits (Cucurbitaceae)-squash, melon, cucumber
- Nightshade (Solanaceae)-tomato, eggplant, pepper, potato
- Legumes (Leguminosae)-beans

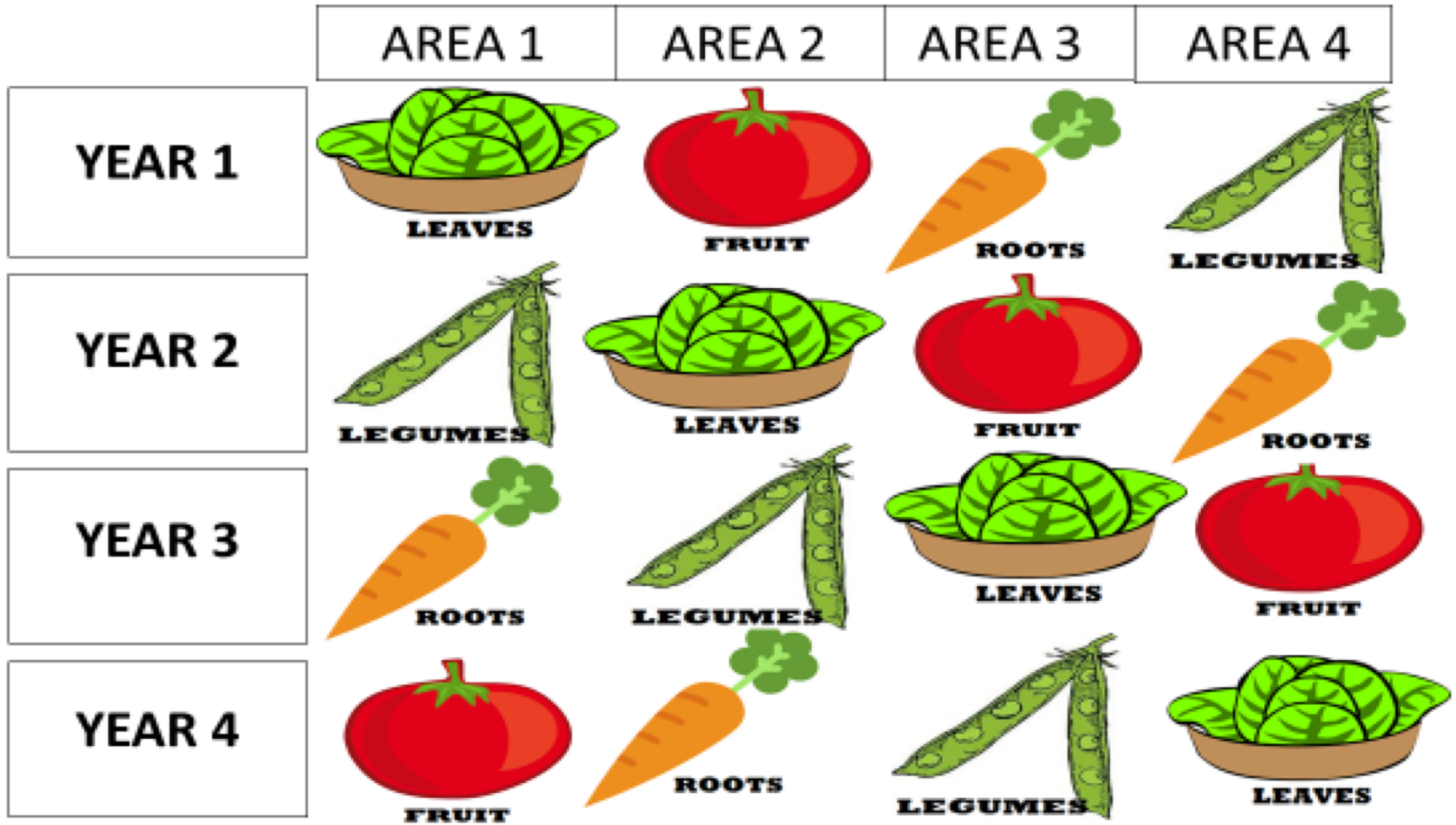
Cool Season

- Umbel-flowered (Umbelliferae)-carrots, parsley, celery
- Onion/Allium (Amaryllidaceae)-garlic, leeks, onion
- Legumes (Leguminosae)-fava

Extended Cool Season

- Cruciferous (Cruciferae)-cabbage, radish, turnips
- Spinach (Chenopodiaceae)-beets, chard, spinach
- Legumes (Leguminosae)-peas

CROP ROTATION CHART



Playing with the Seed Packets

- Do you have all the information you need to know? What's missing? Where could you find it?
- Planting time indoors? Outdoors? Both?
- Number of days to germination? To maturity?
- Light and air/soil temperature needs?
- Serial crop?
- Can you swap around and make a crop rotation? Think FAMILIES, FORM, and FERTILITY.

Know What You're Doing Before You Do It!

- Good Soil – Our native soil is often clay-based. Incorporate organic soil amendments to improve poor soil and increase yield.
- Level Ground – Level ground is easier to prepare, plant and irrigate.
- Water Supply – Locate your garden near a water supply easily reached with a hose.
- Adequate Light - Vegetables need at least 6-8 hours of sunlight each day.
- Close to Home – Plant your garden near your home, making it easier to work in and carry tools back and forth.

Plants grow well in soil that …

Has a healthy physical structure

Contains essential micronutrients

Some Essential Garden Terms That People Sometimes Mix Up

Compost

Mulch

Amendments

Fertilizer

Compost

A mixture of organic matter that is decomposed, i.e., it has been digested by organisms

- **Make it at home**

- **Buy it from recycling plants**

- **Buy it in bags from stores (expensive option)**

Mulch

Material layered on top of the soil to cover and protect it.

- **Mulch serves many purposes: preserves moisture, reduces weeds, prevents erosion, also can slowly add some micronutrients.**

- **Mulch is usually organic (leaves, grass clippings, compost, straw, etc.) but can be inorganic (e.g. plastic).**

- **One of the best mulches is compost**

Amendments

Material mixed into the soil to improve the texture or physical condition of the soil to support healthy plant growth (tilth).

Some examples of amendments include:

- **Barnyard manure**
- **Green Manure and Cover Crops**
  (E.g. Fava Beans, Mustard, Vetches)
- **Packaged mixes**

One of the best amendments is *compost*

- Compost develops into humus to improve soil structure
- Improves drainage and aeration
- Conserves soil moisture
- “Finished” compost can be mixed into the soil right before planting

Distinguish between amendments that can be added right before planting and those that can't

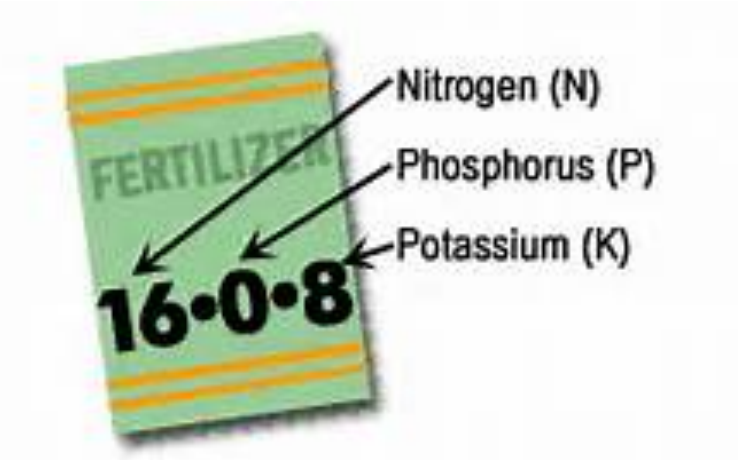
- Some amendments (animal manure, green manure) should be added early enough that organic materials can break down.

Fertilizers

Substances added to soil to provide plants with essential micronutrients

Nitrogen–Phosphorous--Potassium
X-X-X

The three numbers on fertilizer bags and boxes sold in stores show how much of the three most essential micronutrients the product will provide



- **5-X-X Nitrogen (N) promotes green leafy growth**
- **X-5-X Phosphorus (P) assists in flower, seed, and fruit production**
- **X-X-5 Potassium (K) helps develop root and tubers**

Organic vs. Synthetic Fertilizers

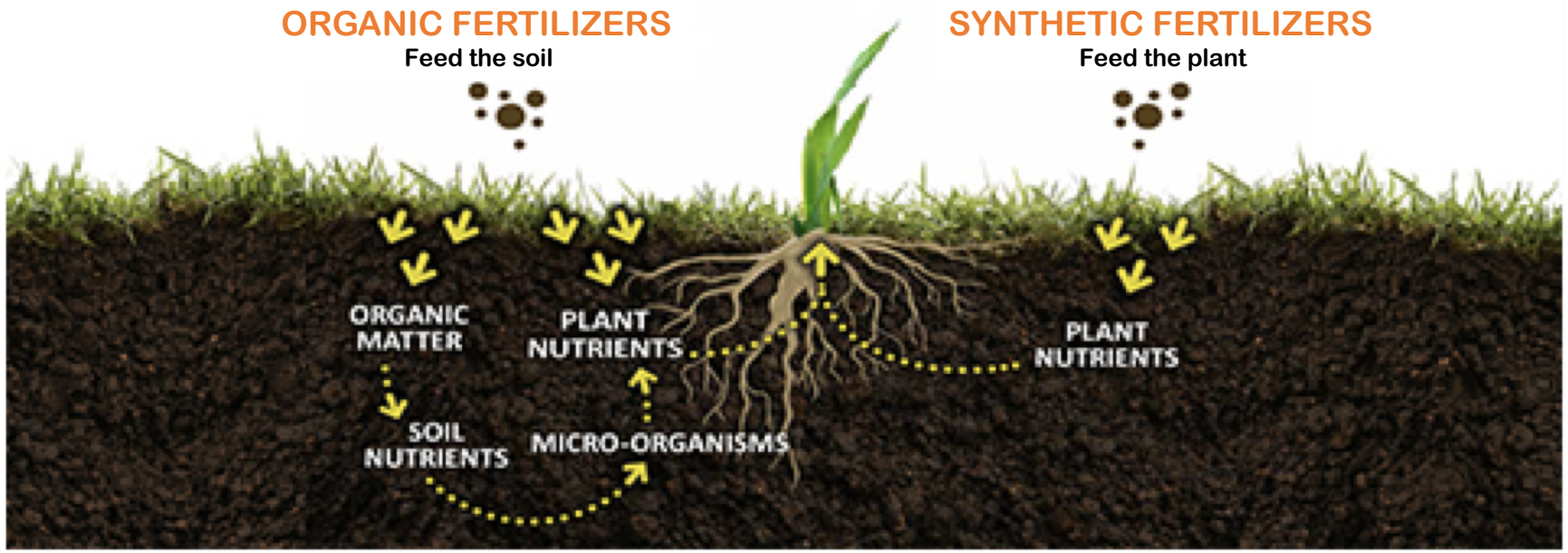


Illustration from www.milorganite.com

Organic

- Slower-acting, sustained release
- Requires microbiological activity to make nutrients available
- Longer-lasting

Synthetic

- Fast-acting
- Water-soluble
- Immediately available to plants
- Not retained in soil

Organic Fertilizer Examples

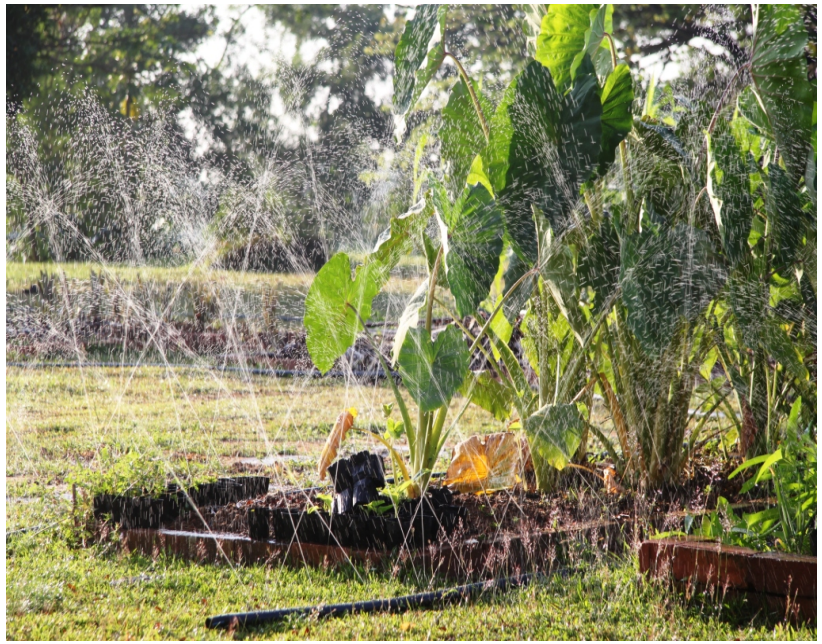
- Commercial organic fertilizers
- Animal manures
- Seaweed (kelp)
- Fish meal or emulsion
- Soybean meal
- Alfalfa pellets
- Bone and blood meal

IRRIGATION, VEGGIES & YOU

Water needs depend on many factors

- Soil Condition (sandy, clay, loam)
- Weather and wind
- Ambient temperature
- Type of vegetable

Over Head Sprinklers?

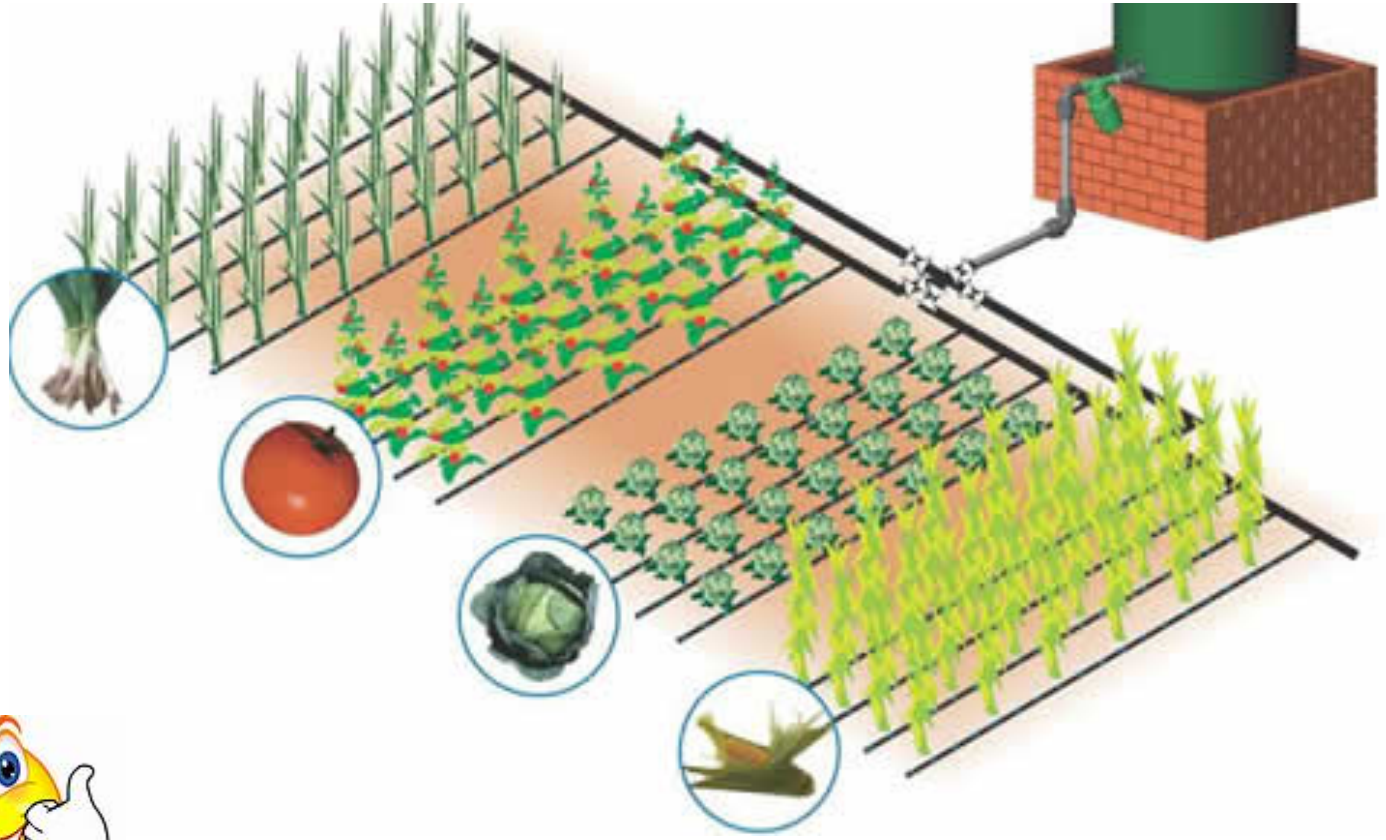


Low labor time, BUT need to water a long time to get deep into roots; water loss to evaporation.

Hand Water?

Labor intensive; Unlikely to get to roots. Need to get down to base of plant. Water evaporation.

DRIP System By Zones



MG OK

Provides deep watering at roots

When to Water

Test: Water if dry at 3-4 inches

Monitor Regularly

Avoid over watering.

NOTE: Drooping leaves do NOT always mean the need for watering. Check the soil. Avoid overwatering. Roots can drown.

Cover Crops


MUSTARD
BARLEY
N-FIXING RHIZOBIA BACTERIA IN ROOT NODULE
BUCKWHEAT
FAVA BEAN

Pests and Diseases

Three types of threats

- Diseases
- Insects and related pests
- Vertebrate pests

Pests and Diseases

What's different in the fall and winter garden?

- Lower temperatures
- More moisture
- Less light
- Cool season crops

Diseases

Cool, moist temperatures favor fungal diseases and rots

- Powdery mildew (can attack virtually any vegetable plant)
- Phytopthera root and crown rot (can affect almost any vegetable plant)
- Rust (beans, leeks, asparagus)
- Damping off and seed rots
- Bacterial rot (broccoli, cauliflower, cabbage)

Powdery Mildew

- Spread by wind
- Does not need a lot of moisture
- Infects living plant tissues
- Prefers moderate temperatures and shade
- Cannot tolerate high temperatures (>90°F) and direct sunlight (or longer-term exposure to free water)

Powdery Mildew

Damping Off and Seed Rot

- Primarily attacks seedlings
- Seed rot = seeds rot in the ground, may be same pathogen as damping off
- Problem: soil too moist and cold, high nitrogen increases problems
- Solutions:
  - start seeds in flats or pots
  - Improve drainage
  - Plant more shallow

Damping Off


UC Statewide IPM Project
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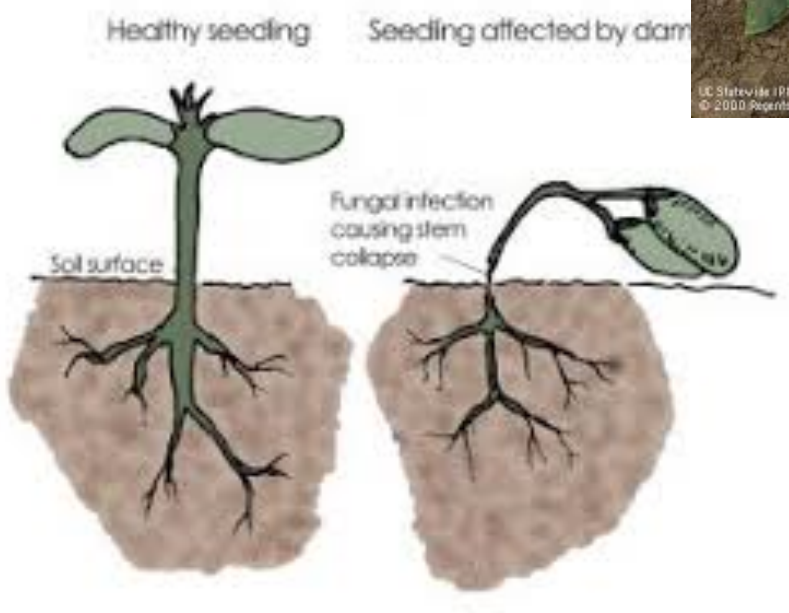
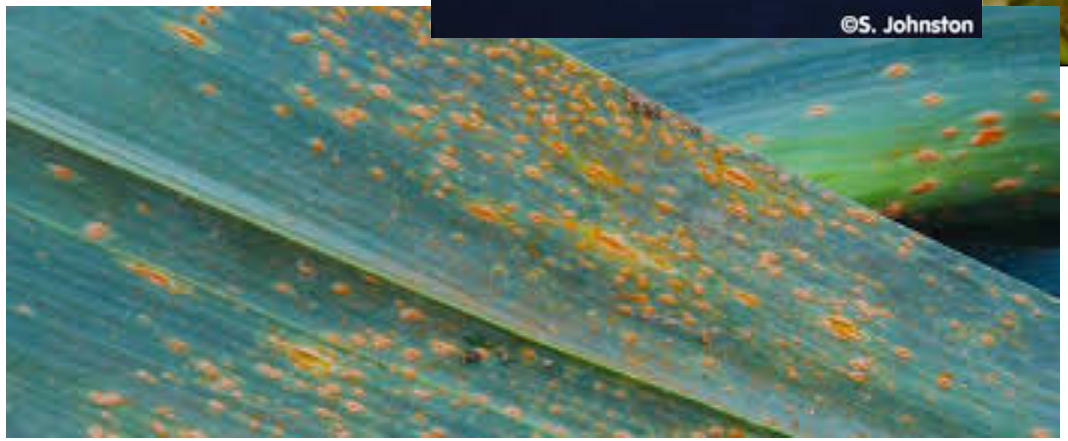

Healthy seedling
Seedling affected by dam
Soil surface
Fungal infection causing stem collapse

Rust

- Prefers moist, mild weather
- Many different species specific to different hosts
- Spread by wind-blown spores
- Solution:
  - Avoid overhead watering
  - Remove affected fallen and infected leaves (sanitation)


©S. Johnston



Phytophthera

- Not quite a fungus – oomycetes
- All need moisture to grow, temperature needs depend on species
- Spread through splashed water, irrigation and rain off-run, contaminated soil and equipment
- Plants affected look drought-stressed
- Solution:
  - Ensure even watering; only as much as necessary
  - Improve drainage; reduce low spots, saturated soil, and standing water
  - Can be reduced significantly by drying out soil
  - Avoid planting susceptible plants in affected location for at least 2 years

Phytophthera

Bacterial Soft Rot

- Symptoms: Small water-soaked areas that later expand causing the tissue to become soft and mushy.
- A strong (foul!) odor may be apparent
- Concern for broccoli, cauliflower, cabbage (can also affect onions, carrots, corn)
- Pathogen enters through wounds, needs moisture
- Plants are most susceptible when temperatures warm up
- Solution:
  - Provide adequate air circulation
  - Control moisture
  - Avoid overhead watering

Bacterial Soft Rot

Insects and Related Pests

- The good news:
  - lower temps mean slower reproduction and growth of most insects
  - many insects go into their overwintering stage
- The bad news: moisture encourages….snails and slugs
- More bad news: year-round veggies mean year-round food for insects and other pests

Leaf Miners

Leaf Miner Control

- Larvae tunnel through leaves and eat chlorophyll-containing tissues
- Control:
  - Remove affected leaves
  - Squash leaf miner larva
  - Interrupt breeding cycle by eliminating preferred foods

Cabbage Moth/Cabbage Looper

Cabbage Looper Damage

Cabbage Moth/Cabbage Looper

- Remove loopers, any eggs by hand
- Exclude moths (floating row cover, bird netting)
- Wait for natural enemies
- Spray Bt

Aphids

Aphids

- Sucking insects
- Protected by ants
- Many different colors
- Remove by water spray
- Control ants!
- Lady beetles, parasitic wasps, lace wings, gall midges are natural predators

Slugs and Snails

Slugs and Snails

- All are hermaphrodites, can lay eggs up to 6 times per year
- Is your damage from slugs or snails? Look for slime trails, or go out at night or in the early morning
- Estivate during the summer
- Control:
  - Hand pick
  - Eliminate hiding places (boards, stones, dense groundcovers, leafy branches close to the ground)
  - Use drip irrigation rather than sprinklers
  - Trap (boards, inverted melon rinds or flower pots), then hand pick
  - Drown in beer-baited cans (or other fermented liquid)
  - Use barriers: copper tape at least 2 inches wide, remove tarnish
  - Baits: iron-phosphate types

Vertebrate Pests

- Gophers, moles, voles, rats
- Birds
- Deer
- Racoons, skunks, opossums

Vertebrate Pests

- Late summer/fall (before rains start): animals are hungry
- During the rainy season: soils are easier for burrowing animals to work

Vertebrate Pest Control Measures

- Exclusion, exclusion, exclusion
- Trapping
  - Kill traps (gophers, rats)
  - Humane traps => need permission to relocate animals
- Poison
  - certain species only
  - Google “UCANR [animal] pest note” and make sure
- …or…tolerance

Napamg.ucanr.edu

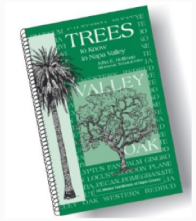
SHARE | PRINT

Gardening Resources

UC IPM's Plant Problem Diagnostic Tool can help you quickly narrow down the causes and solutions of many common (and not so common) plant problems.

Garden Pests and Diseases of California homes and landscapes.

UC Pest Notes Library contains short peer-reviewed scientific publications about specific pests or pest management topics, directed at California's home and landscape audiences.



Master Gardener publications make great gifts!

Common Pests & Problems encountered by Napa County gardeners.

Common Pest and Diseases encountered by Napa County gardeners.

UC Integrated Pest Management contains peer-reviewed UC information and publications about specific pests or pest management topics directed at California's home and landscape audiences.

Vegetable Planting Calendar Everything you need to enjoy a year 'round harvest in Napa County.

Educational and entertaining **YouTube videos from UC IPM**

The School Garden Task Force offers site consultation and provides outreach to parents, teachers and community members who support school gardens in Napa County.

The California Garden Web focuses on sustainable garden practices, highlighting seasonal issues.

Healthy Garden Tips are short information sheets that answer some common local gardening questions. They cover topics such as soil, water, vegetable, tips for general horticulture, and herb and fruit tree care and management.

Garden Links directs you to a host of interesting and informative garden information sites.

Spill the Beans Blog contains articles about growing home garden crops, monthly things-to-do, plant spotlights, current problems encountered/solved at the Napa MG Help Desk and more.

Newspaper Articles written every week by Napa County Master Gardeners.

Weather data from University of California stations located in the Napa Valley.

Fall & Winter Vegetables

Thanks!
Please complete the evaluation before leaving

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