

# Edible Landscaping

## Introduction to Edible Landscaping

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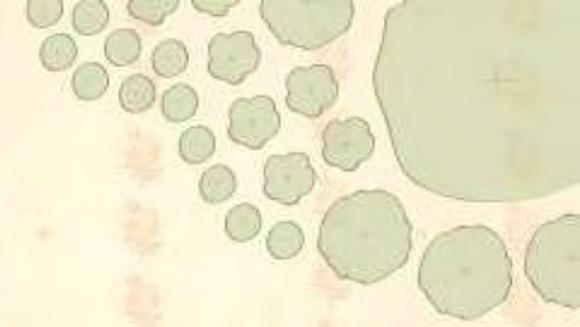
# Overview

## *Definition:*

Edible landscaping is the use of food plants as design features in a landscape. These plants are used both for aesthetic value as well as consumption.

## *Important Note:*

Edible landscapes encompass a variety of garden types and scales but do not include food items produced for sale.



# Overview

## *Combining Form and Function*



Image Source: Rosalind Creasy

# Overview

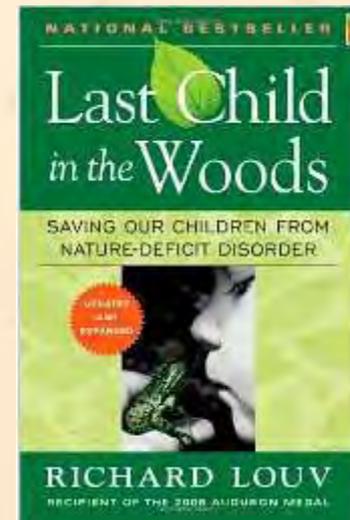
## *Combining Form and Function*



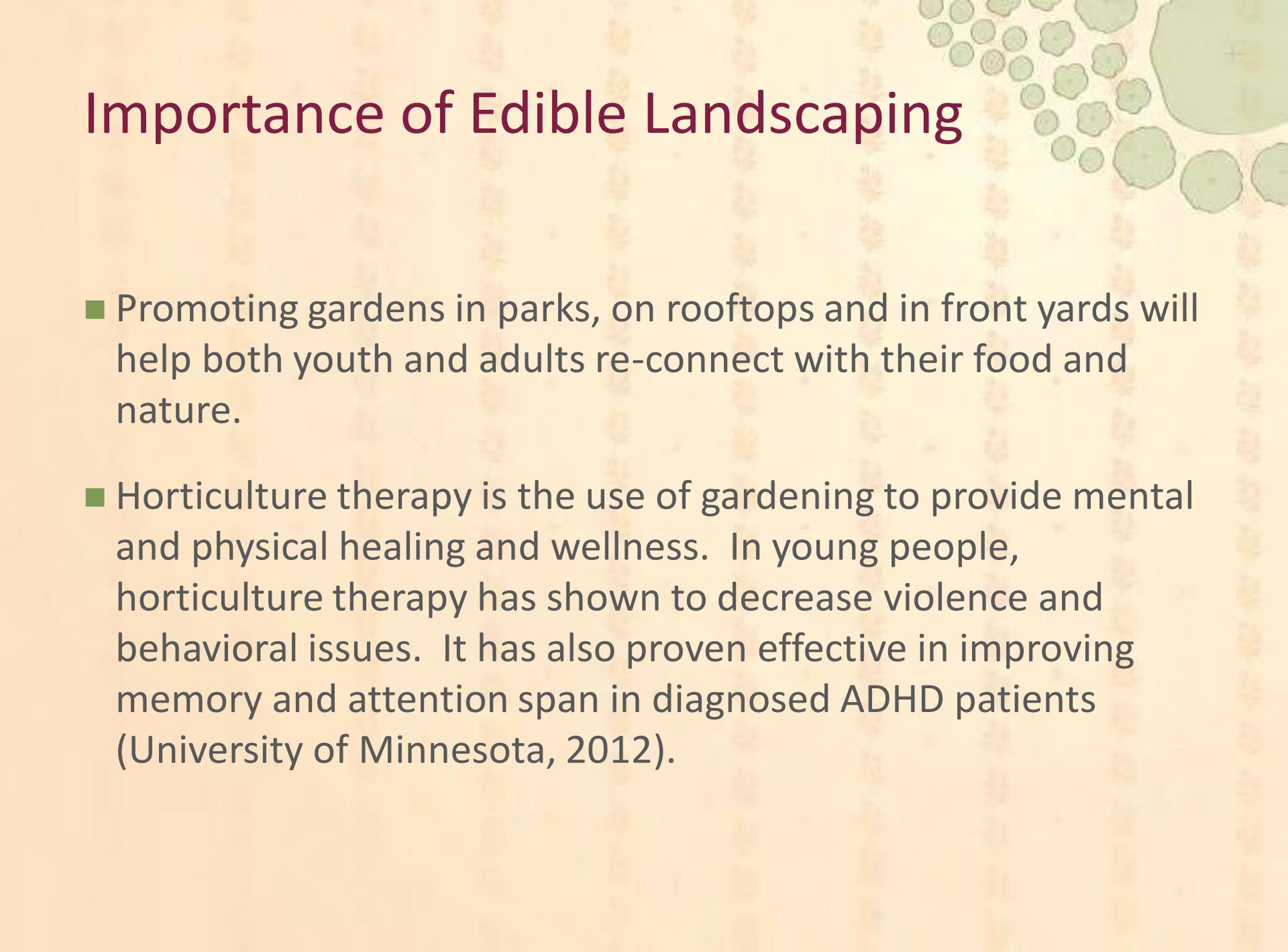
Image Source: Rosalind Creasy

# Importance of Edible Landscaping

- According to the EPA, only **1%** of our 285,000,000 person population claims farming as an occupation. What does this mean? Our children are growing up in a world farther and farther removed from agriculture.
- So few US children can answer where milk comes from that it prompted the USDA to create initiatives to connect children with the source of food.
- A general dissociation from the natural world is Nature Deficit Disorder, an issue identified by Richard Louv.



# Importance of Edible Landscaping



- Promoting gardens in parks, on rooftops and in front yards will help both youth and adults re-connect with their food and nature.
- Horticulture therapy is the use of gardening to provide mental and physical healing and wellness. In young people, horticulture therapy has shown to decrease violence and behavioral issues. It has also proven effective in improving memory and attention span in diagnosed ADHD patients (University of Minnesota, 2012).

# Edible Landscape vs. Traditional Landscape



Image Source: Carmia Feldman

# Edible Landscape vs. Traditional Landscape



Image Source: Rosalind Creasy

# Edible Landscape vs. Traditional Landscape

## *The Pros*

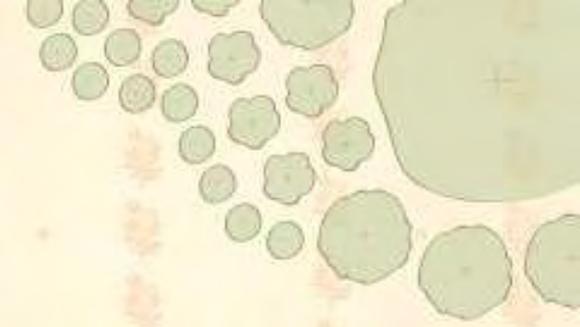
- Environment – decreased food miles, reduced reliance on fossil fuel supported calories
- Health - food security, horticulture therapy, healthy food choices

In general, edible landscaping promotes sustainable gardening practices that maximize water efficiency, support wildlife and reduce the use of chemicals in the landscape.

# Edible Landscape vs. Traditional Landscape

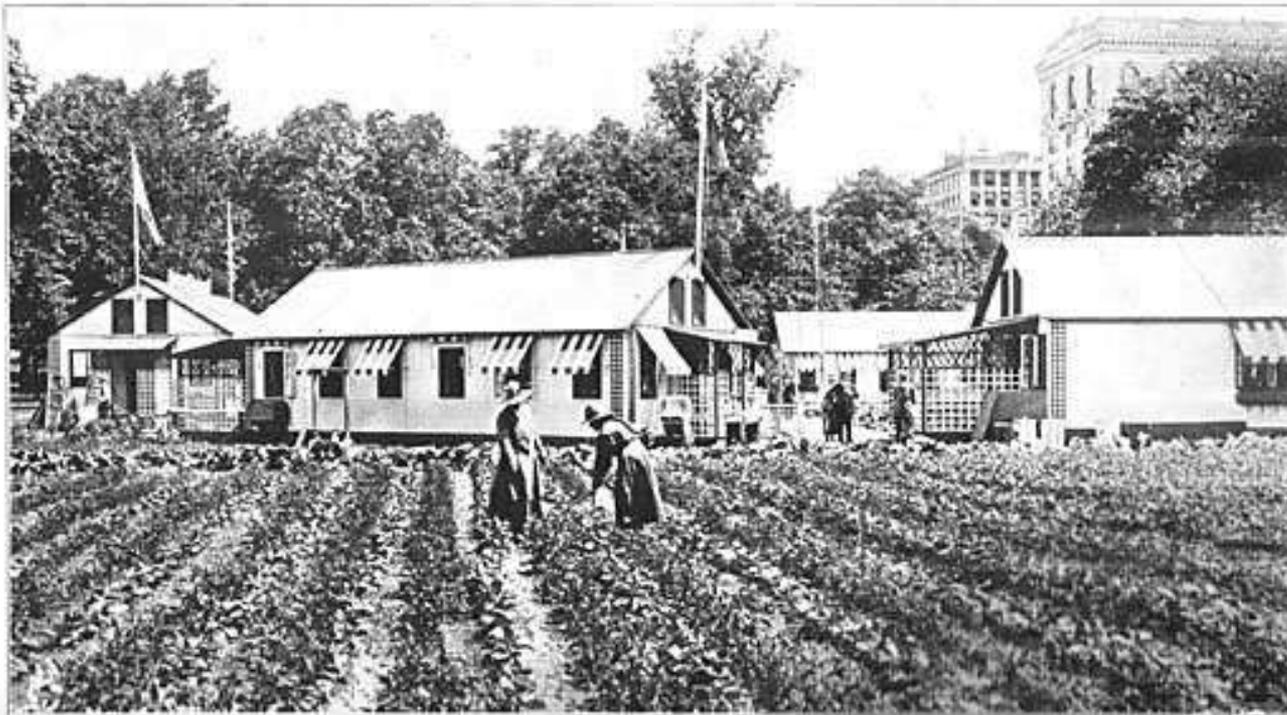
## *The Cons*

- Time – increased maintenance requirements, seasonal planting, regular garden planning
- Inputs – increased water needs
- Practices - increased plant waste typically requires healthy compost pile



# History of Edible Landscaping

- Integrating food growing with other landscape uses (recreational, aesthetic, etc.) is not a new concept



Copyright by E. H. Washburn.

## ON HISTORIC GROUND

Boston Common was credited with having one of the finest demonstration war gardens in the United States in 1918. This shows the quarter-acre section given over to potatoes, with Giel Boulets assisting in the cultivation. The gardens were planted by the Women's City Club, with experts on hand to give instruction and advice to visitors.

# History of Edible Landscaping *parterres & kitchen gardening*



Image Sources: [www.nationaltrust.org.uk/](http://www.nationaltrust.org.uk/) & C. Napawan

# History of Edible Landscapes

*Horticultural practices*



Image Sources: C. Napawan

# Designing Edible Buildings

Rios Clementi Hale Studios

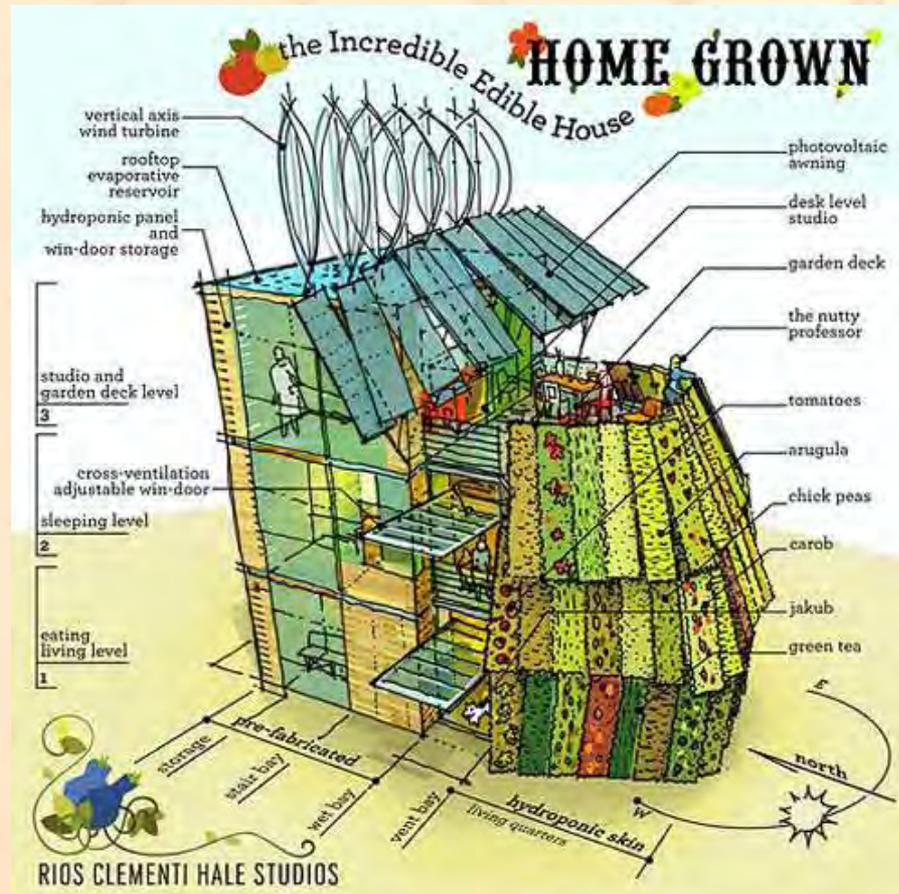


Image Source: <http://blogs.discovermagazine.com/>

# Growing Food Movement



Image Source: AP Images

# Growing Food Movement



Image Source: <http://livinglivelier.blogspot.com/>

The background features a light beige color with a pattern of stylized green plants and trees. The plants are represented by simple outlines of leaves and stems, while the trees are depicted as solid green shapes with a small cross in the center, indicating a trunk. The plants and trees are scattered across the page, with some larger trees in the upper right and lower left corners, and smaller plants in the middle and lower right areas.

# Edible Landscaping

## Site Preparation and Maintenance *Challenges and Opportunities*

Geoffrey Wood  
Master Gardener  
UC Cooperative Extension

# Diverse and Complex Plant Systems

Apply knowledge in crop production to planting and maintaining an integrated, multi-functional landscape system.



# Diverse and Complex Plant Systems

- Increases diversity
- Eliminates monoculture
- Creates habitat for beneficial organisms



# Diverse and Complex Plant Systems

- Plant species and varieties for **yield** and **aesthetics**
- Consider **pollination requirements**



# Sun and Shade Effects



- Crops need full sun and can produce attractive shade



- Affects performance and yield
  - Need at least 6 hours of sun per day
- Plan for seasonal variation in shade and sun angle

# Soil Management

- Limitations compared to traditional gardens
- Raised beds can still work
- Mulches are useful anywhere



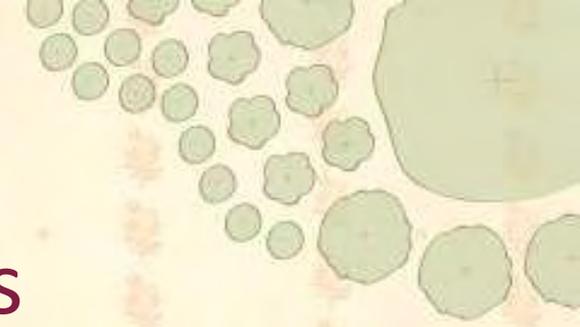
# Inputs Required

- Time and labor
  - Attention, training, maintenance
- Fertilizer
  - Frequency and nitrogen
  - Natural vs. synthetic
- Water
  - Amount
  - Variation in application methods



# Planting and Re-Planting Annual Crops Among Perennials

- Increases diversity
- Difficult to prepare soil for annual crops
- Woody roots interfere
- Disturbs perennial root systems



# Maintaining Ornamental Function

- Ornamental value of some food crops wanes
- Remove crop debris
- Harvest ripe fruit and mature produce



# Green Waste Management

- Crops can increase plant debris and green waste
- Debris can be composted



# Pests and Weeds

- Pest management often more demanding with edibles
- IPM more complex



- Weed management without herbicides



The background features a light beige central area surrounded by green foliage. The foliage includes various shapes of leaves and flowers, some with small black crosses in the center, suggesting a garden or landscape design. The overall style is hand-drawn and artistic.

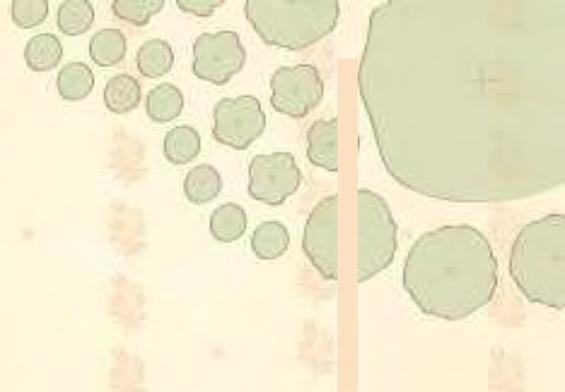
# Edible Landscaping

Site Preparation and Maintenance  
*Soils*

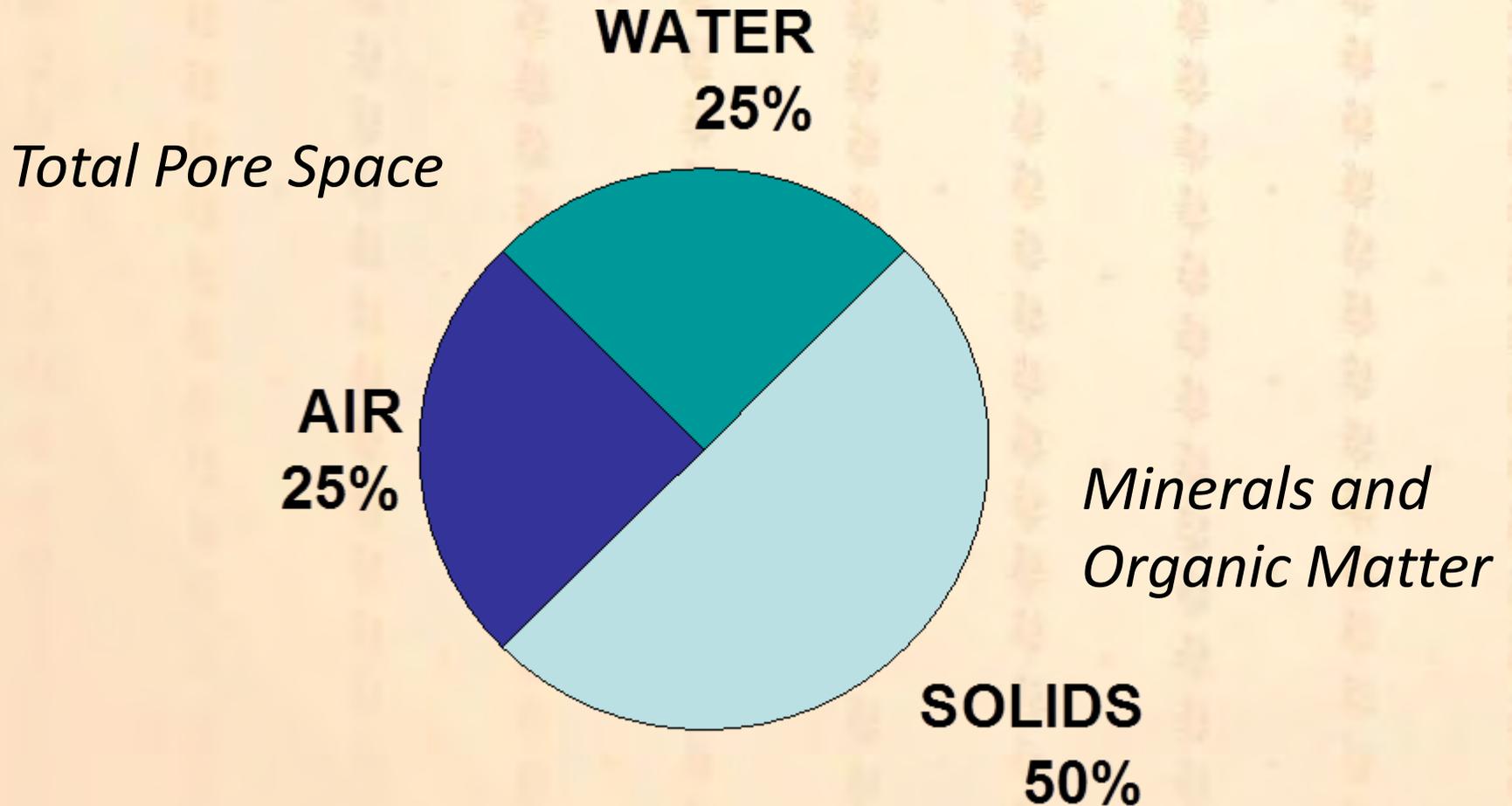


# Soil Functions

- Physical support for plants
- Water reservoir
- Nutrient reservoir
- Air reservoir



# Soil Physical Components



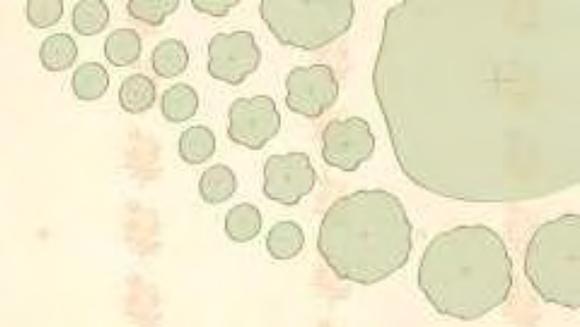
# Soil Properties

## ■ Physical Properties

- Texture
- Structure

## ■ Chemical

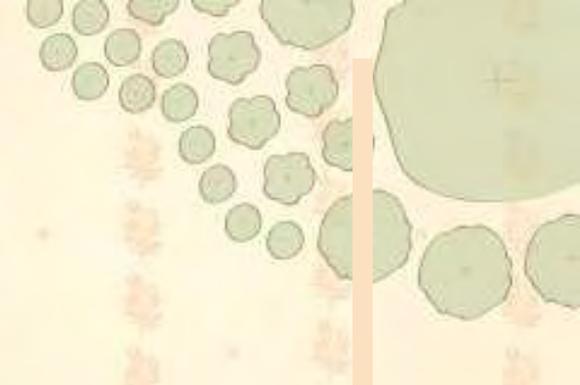
- 17 essential elements (N, P, K and friends)
- Soil reaction (pH)
- Salinity (EC)
- Toxic ions (sodium, boron)





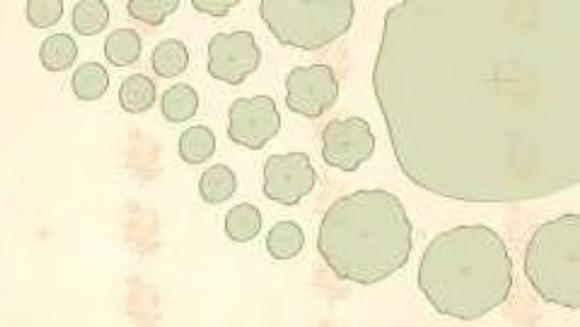
# Soil Structure

- The arrangement of soil solids into aggregates and the relative pore space created
- Good structure:
  - Forms small granules readily
  - Mix of large and small pores
- Influences:
  - Aeration
  - Drainage
  - Root growth



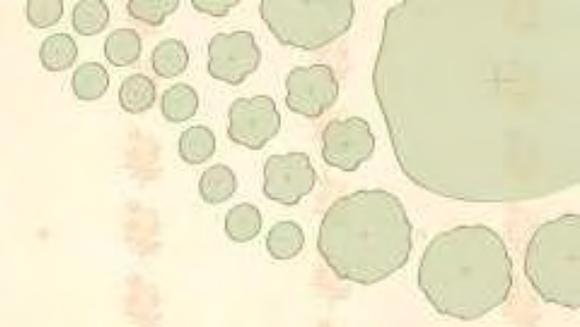
# Soil Structure – Organic Matter

- Organic matter (plant debris, humus, etc.)
  - Provides binding agents
  - Improves structure
  - OM breaks down over time



# Soil Texture

- Percentage by weight of sand, silt, clay
- Influences:
  - Water holding capacity
  - Water movement
  - Nutrient holding capacity
  - Tillage and workability
- Major textural classes:
  - Sands, silts, loams, clays





Sandy



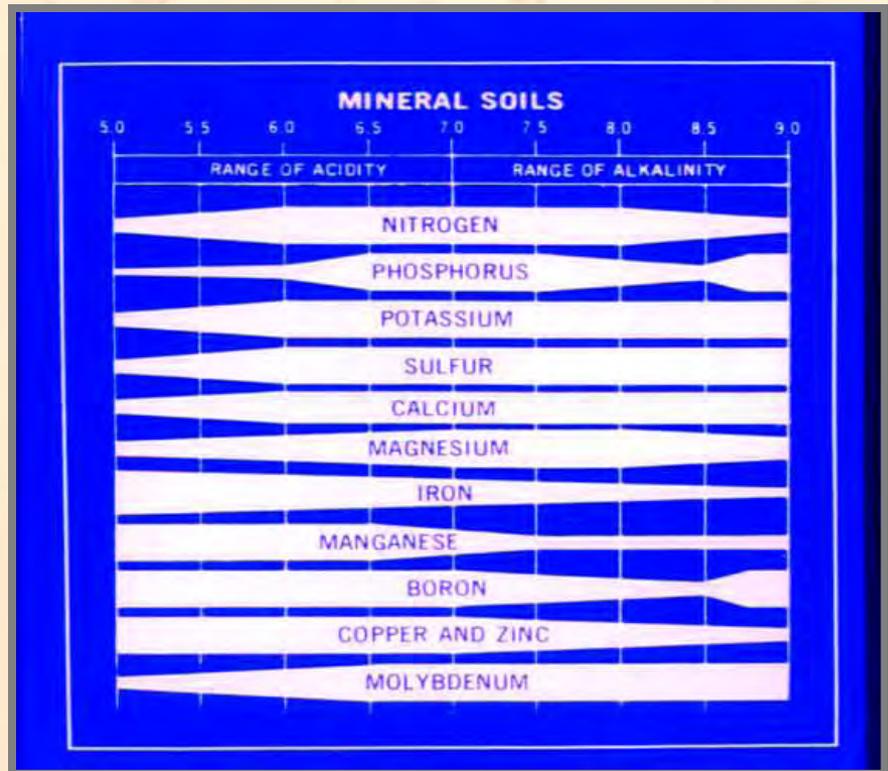
Clayey



Edible  
Landscaping

# + Soil Reaction - pH

- Acidity or Alkalinity of Soil Solution
- 7.0 = neutral
- <7.0 = acidic;
- >7.0 = alkaline
- Crops grow best at 5.5 – 7.5



# Soil Management Considerations in Edible Landscaping

- Routine replanting annual crops
- Inter-planting edible crops into existing landscape areas
- Fertilizer management for edibles vs. ornamentals
- Container growing



# Routine Replanting Annual Crops

- Dedicate bed space if possible
- Amend before planting with OM, perlite, etc.
  - Difficult to amend area after landscape site is established
  - Eases transplanting



# Inter-planting Edible Crops Into Existing Landscape Areas

- Can be difficult to inter-plant seasonal crops routinely among established ornamentals
  - Difficult to dig and cultivate soil
  - Disturbs roots of established ornamentals
- Do soil conditions meet needs of seasonal or perennial edible plants being added?

# + Container Growing

- Avoids soil management issues
- Select quality potting media
  - Bark, forest products, coir
- Leach before planting
- Assure good drainage
  - No gravel in container bottom





# Edible Landscaping

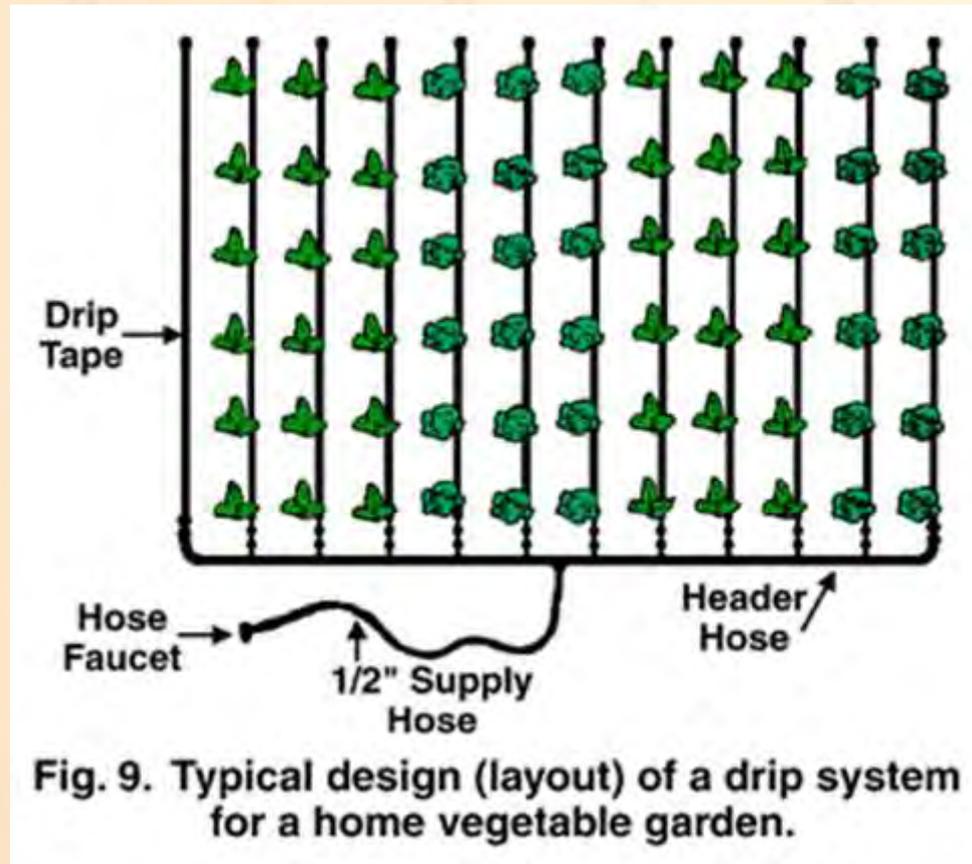
Site Preparation and Maintenance

*Irrigation*

# Traditional Garden Layout



# Traditional Garden Layout



**Fig. 9. Typical design (layout) of a drip system for a home vegetable garden.**

# Edible Landscape Layout



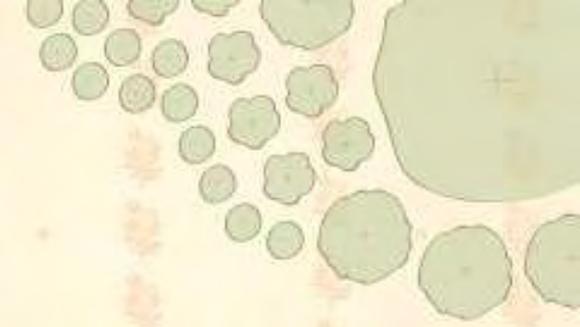
# Edible Landscape Layout

- Think of the possibilities!



# Water Use

- What drives water use of plants?
  - Plant species ( $ET = E_{to} \times K_c$ )
  - Planting density
  - Microclimate factors

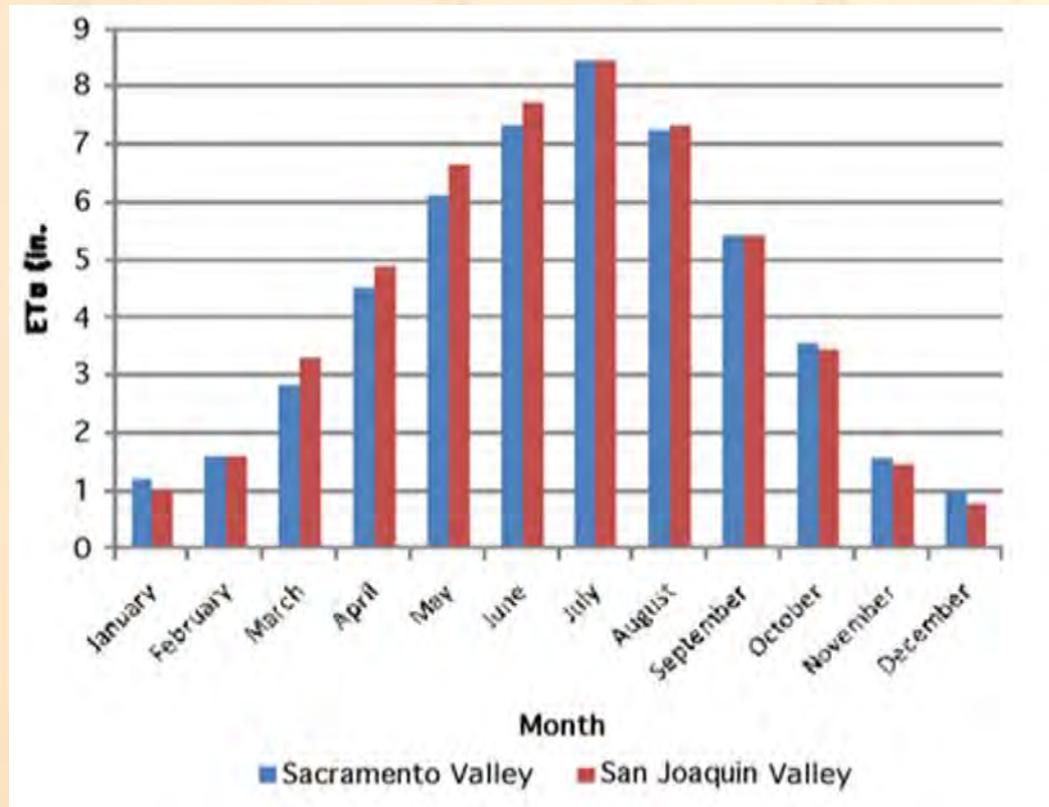


# Water Use - Hydrozone



# Water Use

- Evapotranspiration Rates



# Water Use

## New Legislation!

$$\text{MAWA}^* = (\text{Eto})(0.7)(\text{LA})(0.62)$$

Eto = Reference evapotranspiration (inches per year)

0.7 = ET adjustment factor

LA = Landscaped area (square feet)

0.62 = Conversion factor (to gallons)

\*Maximum Applied Water Allowance = \_\_\_\_\_ gallons/year



# Water Use

## Example of Maximum Applied Water Allowance (MAWA)

- Sacramento area (annual historical ETo = 52 in)
- Hypothetical Landscape Area = 5,000 sq ft
- $MAWA = (E_{to}) (0.7)^* (LA) (0.62)**$
- $MAWA = (52) (0.7) (5,000 \text{ sq ft}) (0.62)$
- MAWA = 128,400 gallons per year

\*ET Adjustment factor

\*\* Conversion factor from inches to gallons

# Water Use

Higher density = greater water requirement



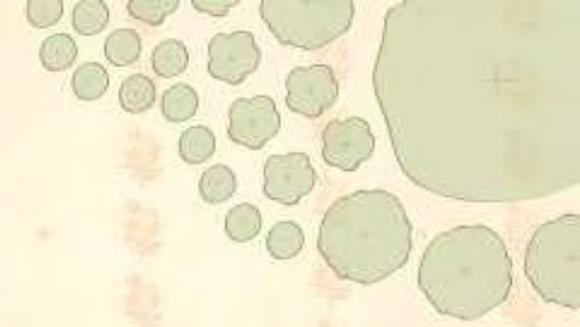
# Water Use

## Varying Microclimates



# Conserve Water

- Conserve water in your edible landscape by:
  - Hydrozoning
  - Scheduling irrigations based on plant needs
  - Making sure sprinklers/drip systems work properly
  - Using mulch and soil amendments effectively



# Conserve Water

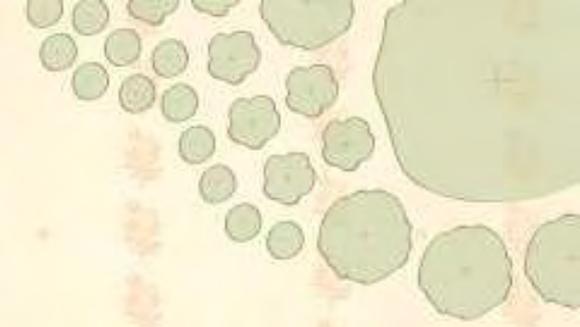
Hydrozone: Place plants with similar water needs together and irrigate them accordingly



# Conserve Water

## ■ Use Efficient Systems

- Hand watering can be very efficient!
- Drip (low flow, low volume and includes mini-sprinklers, tape, soaker hoses, etc.) also efficient

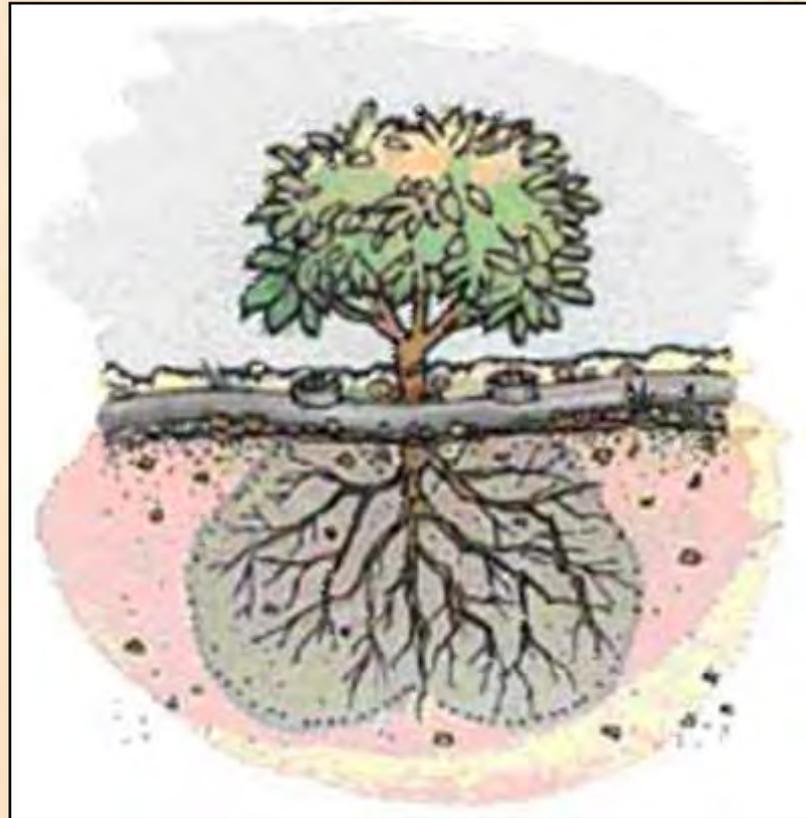


# Conserve Water



# Conserve Water

- Drip Irrigate Edibles to Reduce Soil Evaporation and to Apply Water Directly into Root Zones



# Many Types of Drip Systems

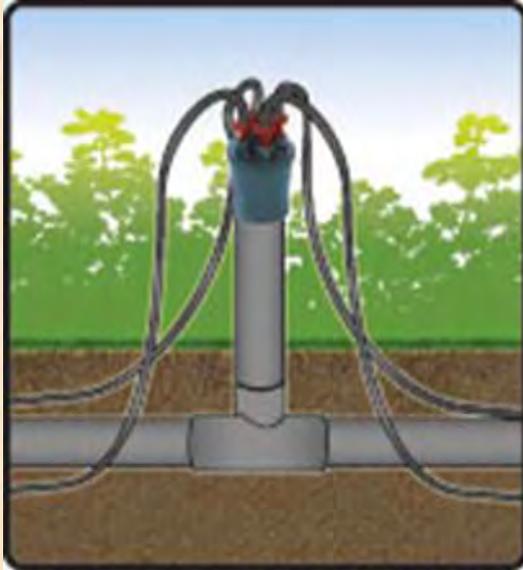
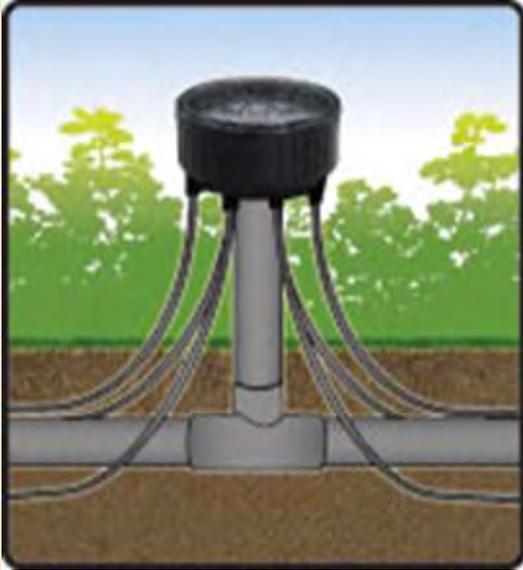




# Sprinkler System Retrofitting

- Retrofit a sprinkler system to use or convert an existing 1/2" riser or sprinkler head to a 1, 4, 6, or 12-outlet drip system without disrupting the flow through the rest of the line

# Sprinkler System Retrofitting



# Conserve Water

Improve water-holding capacity and/or drainage with compost mixed evenly into soil (6 inches to 1 foot)



# Conserve Water

Apply mulch around plants



# Other Methods to Conserve Water In and Around Edible Landscapes

- Remove weeds to reduce competition for water
- Irrigate established plants deeply and infrequently
  - Avoid watering every day
  - Water a few inches below the current root system during each watering to encourage deep rooting
- Avoid over-fertilizing
  - Creates flushes of weak growth
  - Increases water requirement

# Graywater Systems

Laundry-to-landscape systems do not require a permit if they:

- direct flow back to the sewer (eg: a 3-way valve)
- have valves and direction of graywater flow clearly labeled
- supply graywater to landscape plantings only on the home owner's property
- include an operation and maintenance manual
- discharge graywater underneath a 2-inch cover of mulch, plastic shield, or stone covering.

**NEVER** use graywater on edible plants. If using graywater near edibles, be sure not to splash on them.



# Edible Landscaping

Site Preparation and Maintenance  
*Green Materials Management*

# Green Materials Management

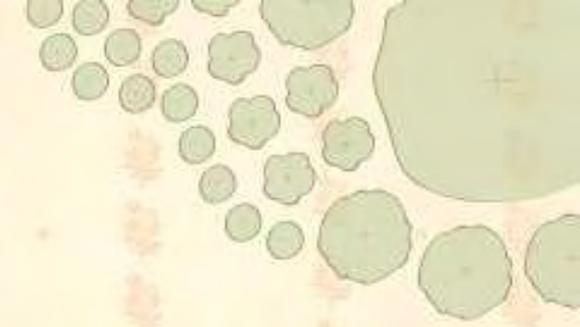
Important uses for organic materials in edible landscapes:

- Soil Amendments (mixed into the soil)
- Mulches (applied on top of the soil)



# Soil Amendments: Compost

- Improves water and nutrient holding capacity
- Improves drainage in heavy soils
- Prevents/reduces erosion
- Improves soil aeration
- May decrease chemical fertilizer requirement
- Increases number and range of microbes



# Waste Management

- The CA Waste Management Act (Assembly Bill 929)
  - Divert 25% of organic matter destined for landfills by 1995
  - Divert 50% of organic matter destined for landfills by 2000
  
- A.B. 341 (passed 2011)
  - 75% solid waste landfill diversion through source reduction, recycling and composting by the year 2020



# Soil Amendments: Compost

Compost is not a fertilizer but does contain small amounts of:

- Nitrogen and phosphorus (mostly in organic forms)
  - Released slowly to plants
  - Not readily leached from the topsoil
- Micronutrients that are essential for plant growth



# Soil Amendments: Compost

## How do you make high quality compost?

- Pile should be 3' x 3' x 3' or larger
- Maintain correct C:N ratio (30:1) by adding equal volumes of both 'greens' and 'browns'
- Turn pile weekly
- Keep pile moist but not soggy (aeration)
- Maintain a high enough temperature (135°F/3days)
- Cure before using

# Soil Amendments: Compost

## How to Amend Soil with Compost

- Amend entire planting site or bed when possible, adding at least 30 percent compost (by volume) to original soil
- Thoroughly mix compost 6 inches to 2 feet deep (depending on depth of expected root zone)
- Seed edibles directly into garden soil amended with compost or transplant seedlings/container plants into amended soil at same depth they were in their containers
- Irrigate immediately and maintain a moist root zone through establishment

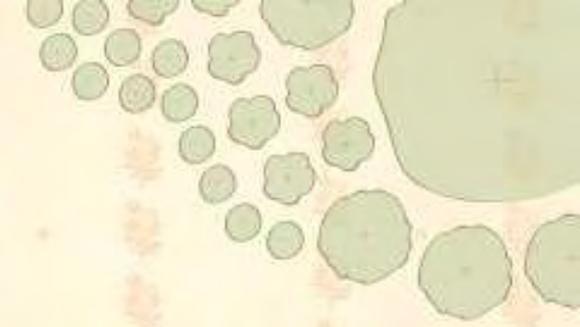
# Avoid Adding Compost/Soil Amendments to Tree Planting Sites

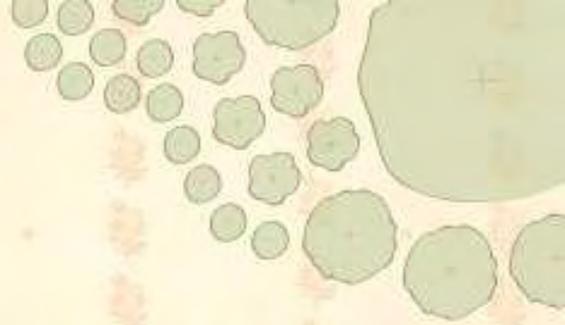
- Roots may circle the planting hole resulting in a root bound plant not able to support the upper structure



# Mulch

- Reduces water evaporation from soil
- Prevents/reduces erosion
- Buffers soil temperature
- Reduces weeds
- Prevents mechanical weed whip/lawnmower damage to tree trunks







*Mulch Volcano*  
excavated to expose  
buried trunk. Mulch  
should not be touching  
the trunk. Some trees  
develop girdling roots  
and/or disease  
problems.

# Mulch

## Compost Criteria when used as a Mulch

- Apply 2.5-3.5 inches of mulch on top of the soil
- Carefully spread compost around the base of plants using a shovel or rake
- Avoid applications around tree trunks
- Apply outward toward dripline of trees

# Mulch

## Bark chips or nuggets

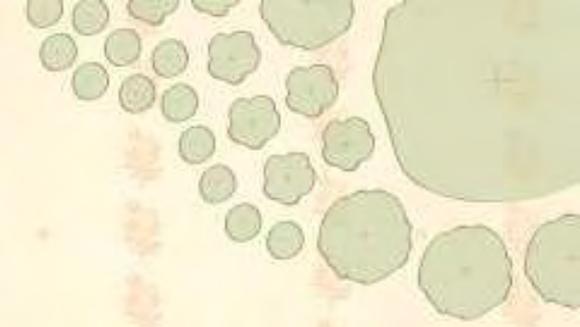
- Bark nuggets ( $\frac{1}{2}$  to  $1\frac{1}{2}$  inches) are more stable than smaller bark or woodchips and do not break down as quickly
- The larger the particle size, the greater the depth to provide adequate weed control



# Mulch

## Fabric Mulch

- Also called geotextiles or weed barriers
- Woven and non-woven polypropylene polymers (synthetic material).
- Some polypropylene polymers oxidize and degrade under ultraviolet light (cover with bark or woodchips)



# Mulch

## Fabric Mulch (cont'd)

- Best used around shrubs and trees (long-term plantings)
- Cut slits in fabric and add it after adding edibles to your landscape
- Allows water, fertilizer, and oxygen to penetrate soil
- Excellent weed control agent
- Bark or wood chips may be added on top

# Mulch



Landscape fabric



Landscape fabric under mulch

The background features a light beige central area with a green border. Stylized green foliage, including various tree and shrub shapes, is scattered in the corners. The main title is written in a dark red, cursive font.

# Edible Landscaping

Site Preparation and Maintenance  
*Pest Management*

# Integrating Pest Management into your Edible Landscape

## ■ “Integrating”

- What IPM techniques have been mentioned so far?
  - Choose well-adapted species and variety selection
  - Avoid over-fertilization and overwatering that can lead to pest problems
  - Weed control – use of herbicides and mulches



# Integrated Pest Management

[www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu)

- Same IPM approach for Edibles and Ornamentals
  - Expectations are important
- Correct Pest Identification - Vigilance!
  - Beneficial insect identification
- Cultural and Mechanical Controls
- Conservation of Biological Controls
- Chemical controls as a last resort



# Cultural Controls for Pests in Edible Landscapes

- Select low-pest species
  - Hint: Do you see chard in the list below?
- Timing
- Rotation?
  - Biofumigation
- Pulling plants to break pest cycle

## How to Manage Pests

### Pests in Gardens and Landscapes—Vegetables and Melons

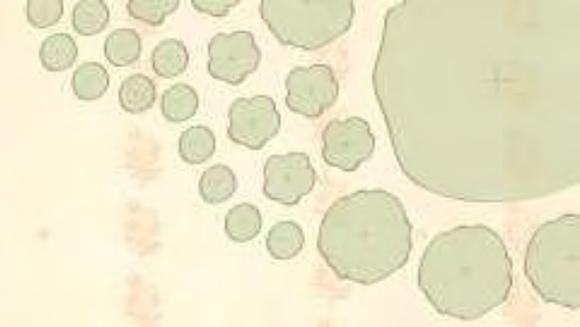
Search vegetables:

#### Vegetables and melons

- [Artichokes](#)
- [Asparagus](#)
- [Beans](#)
- [Broccoli](#)
- [Brussels sprouts](#)
- [Cabbage](#)
- [Cantaloupe](#)
- [Carrots](#)
- [Cauliflower](#)
- [Corn](#)
- [Cucumbers](#)
- [Eggplant](#)
- [Lettuce](#)
- [Onions and garlic](#)
- [Peas](#)
- [Peppers](#)
- [Potatoes](#)
- [Pumpkins](#)
- [Spinach](#)
- [Squash](#)
- [Tomatoes](#)
- [Watermelon](#)

# Pest Management in Edible Landscapes

- Pesticide and Label Information
  - For edible plants
    - Limited number of applications per year
    - PHI – Pre-Harvest Interval
  - For ornamental plants
    - May or may not limit applications per year
    - Generally do not include PHI



# Pesticides in Edible Landscapes

- Pay attention to label!
  - Applications per Season
  - Minimum Days to Reapply
  - Pre-harvest Intervals
- Example Label for edible plants - spinosad

Crops	Pests Controlled	Maximum Number of Applications Per Season	Minimum Days To Wait Before Reapplying	Minimum Days To Wait From Last Application To Harvest
<b>Cucurbits</b> including cucumber, summer and winter squash, muskmelons (cantaloupe, honeydew, etc.) pumpkin, edible gourds, and watermelon	Leafminers Thrips Worms  (caterpillars)	6	5	All except cucumber 3 days  Cucumber 1 days

# Pesticides in Edible Landscapes

- Pay attention to label!
  - Directions for application to ornamentals can be very different
  - No pre-harvest intervals
- Example Label for ornamental plants - spinosad

**Outdoor Ornamentals**  
(herbaceous and woody plants)

**Gall midges  
Leaf feeding beetles  
Leafminers  
Sawfly larvae  
Spider mites  
Worms, including  
Loopers, webworms,  
Bagworms, gypsy Moth,  
and tent caterpillars**

**Mix the amount of concentrated pesticide recommended per pint, quart or gallon of spray and uniformly spray foliage to point of runoff. Uniform coverage of upper and lower leaf surfaces is essential for effective insect control**

- Drift/Runoff from ornamentals to edibles

The background features a light beige color with faint, repeating text 'Edible Landscaping' in a light green font. Stylized green plants and trees of various shapes and sizes are scattered across the page, some with small crosses in their centers. The entire design is framed by a dark green border.

# Edible Landscaping

Site Preparation and Maintenance  
*Fertilizing the Edible Landscape*

# Fertilizer Management for Edibles vs. Ornamentals

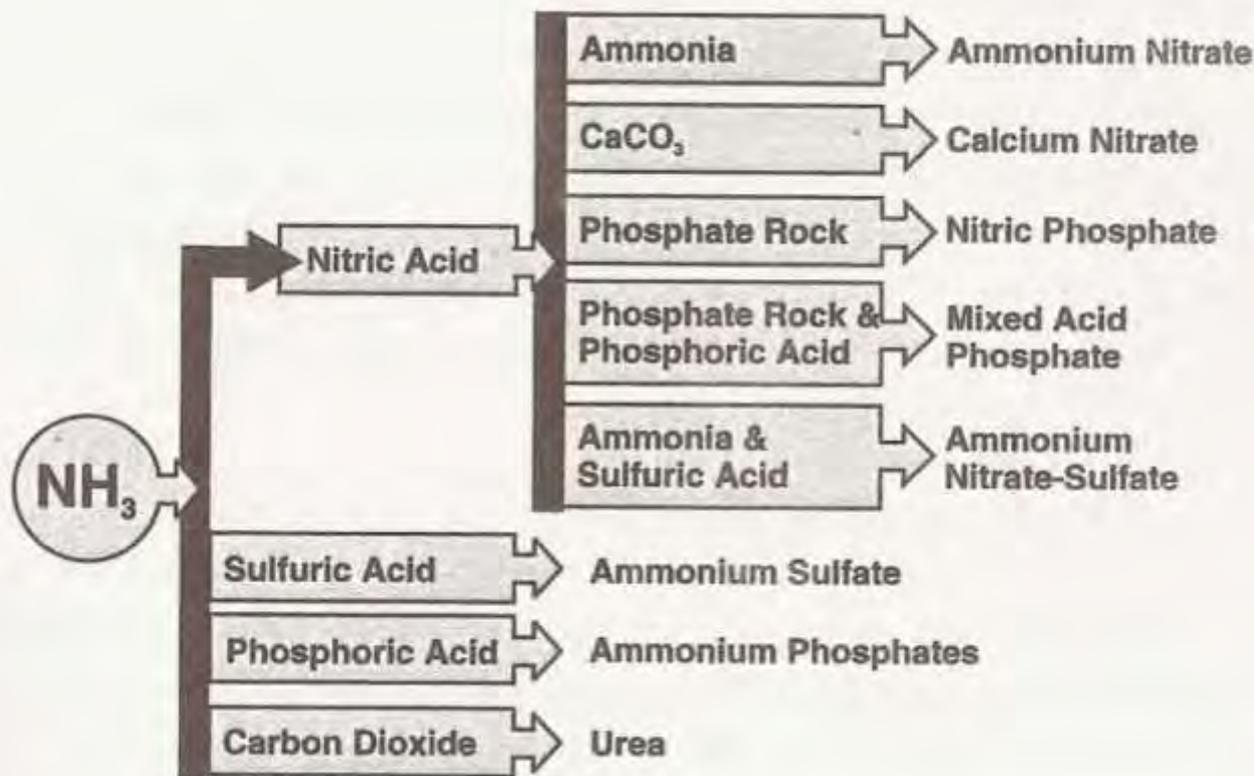
- Edibles often have greater fertilizer need
  - Especially N
  - Special nutrient needs for some crops to produce well
- Edibles often require more frequent fertilization
  - Sidedress N on seasonal crops
  - Annual fertilization of perennial crops
- Consider using slow-release N



# Fertilizers and the Edible Landscape: Natural vs. Synthetic Fertilizers

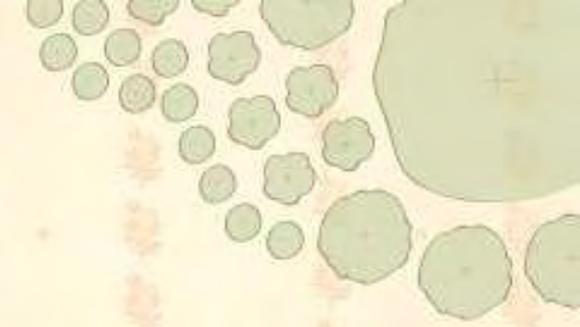
Natural Fertilizers	Synthetic Fertilizers
Feed the microorganism in the soil which break it down for the plants	Provide nutrients immediately available to plants but may not help soil ecosystem
Nutrient content may not be known for manures and other organics	Precise nutrient content known
Slow release, hard to damage plants	Can burn plants with too much too fast; can also leach out quickly
Bulky – uses more resources to ship but derived from renewable resources and can even utilize “waste” products	More compact thus more efficient to ship, but made from non-renewable resources
Often more costly	Usually less expensive

# Conversions of Ammonia to Various Nitrogen Fertilizers



# Examples of Synthetic Nitrogen Fertilizers

- Ammonium sulfate (21-0-0-24S)
- Ammonium nitrate (34-0-0)
- Urea (46-0-0)
  - Highest %N; protein substitute in feeds



# Animal-Based Natural Fertilizers

## ■ Animal Products

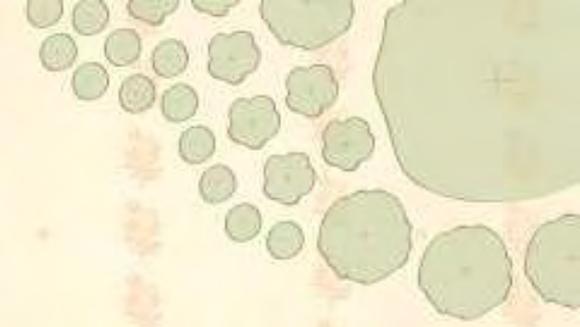
- Blood meal (12-0-0)
- Bone meal (1-13-0 to 4-12-0, +22% Ca)
- Feather meal (12-0-0)
- Fish products (4% to 11% N)

## ■ Animal Waste Products

- Bat guano (3% to 10% N, up to 12% P, 1% K)
- Manure/compost (1% to 4% N)

# Plant-Based Natural Fertilizers

- Alfalfa meal (about 2-1-2)
- Cottonseed meal (about 6-2-1)
- Soybean meal (7-2-1)
- Kelp/seaweed (used for micronutrients, hormones, vitamins, and enzymes)



# Mined Natural Fertilizers

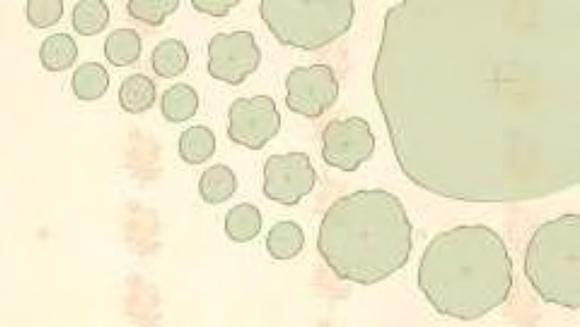
## Phosphorous

### ■ Phosphorous

- Soft rock phosphate (16% P and 19% Ca)
- Natural deposits in N. America, China, Morocco, & former Soviet Union

### ■ Potassium

- Various forms
- World reserves deposited when water from ancient inland oceans evaporated
- Canada is the #1 Producer
- U.S. has reserves in New Mexico, Utah



# Nutrient Costs of Selected Fertilizers

## Local Nurseries, January 2011

<b>Product</b>	<b>Analysis</b>	<b>\$/Lb. of N (3-5 lb. bag/box)</b>
<b><u>CHEMICAL</u></b>		
Azalea/Camellia	4-8-5	\$6.46
Rose	5-10-5	\$5.49
Multi-Purpose	16-16-16	\$2.29
Citrus	12-8-4	\$4.58
<b><u>“NATURAL” BRAND</u></b>		
Azalea/Camellia	4-5-4	\$17.31
Rose	5-7-2	\$16.07
Multi-Purpose	4-4-4	\$18.75
Citrus	7-3-3	\$11.25

# Nutrient Costs of Selected Fertilizers

## Local Nursery vs. Peaceful Valley Farm Supply (Box vs. Bulk)

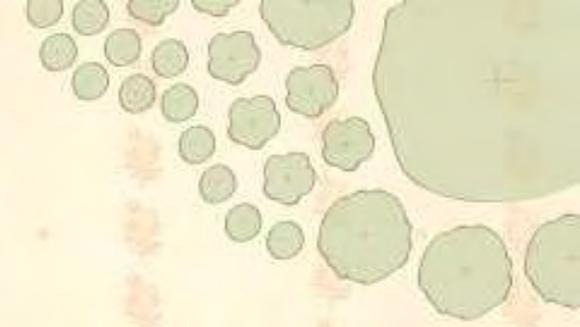
<b>Product</b>	<b>Analysis</b>	<b>\$/Lb. N</b>
<b><u>NURSERY (3.0 to 3.5 lb.)</u></b>		
Alfalfa meal	4-8-5	\$40.00
Blood meal	13-0-0	\$16.81
Cottonseed meal	5-2-1	\$21.43
Bat guano (1.5 lb.)	10-3-1	\$38.10
<b><u>PVFS (50 lb.)</u></b>		
Alfalfa meal	2.4-0-0	\$18.33
Blood meal	13-0-0	\$9.23
Cottonseed meal	6-2.5-1	\$7.37
Bat guano (25 lb.)	10-6-2	\$16.66
<b>Nutri-Rich</b>	<b>4-3-3</b>	<b>\$2.80</b>

# Nutri-Rich Pelleted chicken manure



# Thank you!

- Any Questions?



The slide features a light beige background with a dark green border. In the top-right and bottom-left corners, there are clusters of stylized green plant icons, including circles, flowers, and larger rounded shapes, some with small crosses inside. The main title is written in a dark red, cursive font.

# Edible Landscaping

## Harvest and Storage of Edible Plants

Rebecca Niec  
Master Gardener  
UC Cooperative Extension

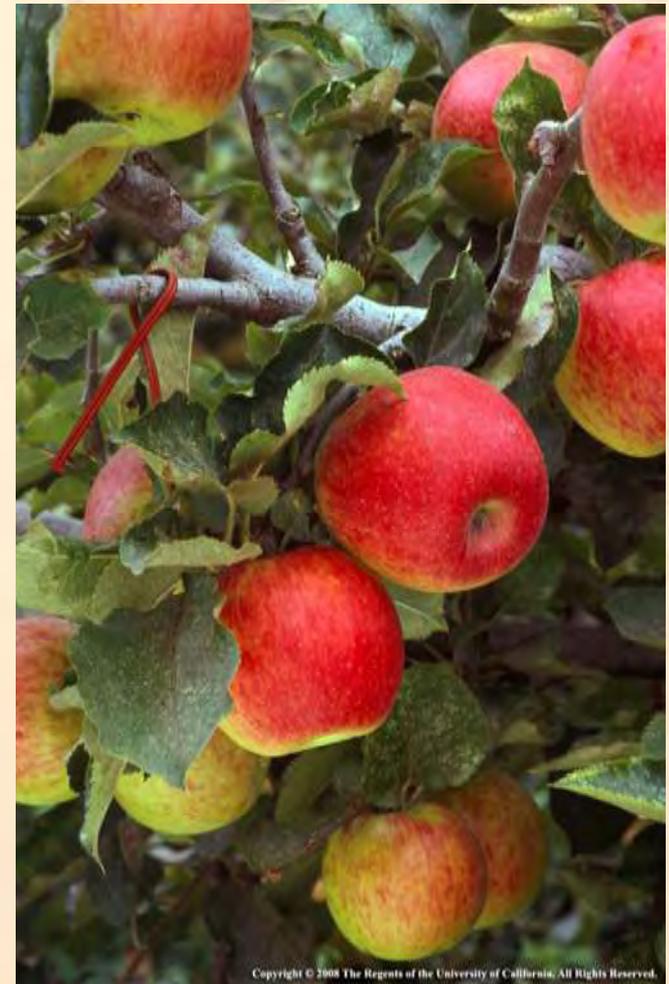
# Why Pay Attention to Harvest?

- Resources go into producing a crop
- Allows harvest to suit personal ripeness and preferences
- Plan to be available to process harvest



# General Rules of Harvest

- Each crop has optimum harvest period and method
- Variations are based on:
  - Individual taste preferences
  - Socio-cultural orientation
  - Physiological characteristics of fruit
  - Varietal differences
  - Planned use of crop
- Harvest during cool temperatures



# Stages of Ripening

- Fully tree ripe
  - Full maturity and optimal stage for harvest
  - Best for fresh eating and drying
- Firm ripe – better to freeze or can
- Some important quality factors
  - Taste
  - Color
  - Firmness
  - Size
  - Minimal defects



# Sanitation and Harvest

- Use only clean, sanitized buckets and bins
- Wash hands prior to harvest
- Wear clean cotton gloves to reduce contaminants on fruit
- Do not stack bins/buckets



# Clip - Twist - Layer

- Fruits such as persimmon, pomegranate, quince and grapes require clipping
- Avoid damage to skins of tender fruits by layering with newspaper
- Tomato family can be twisted or clipped
- Squash family
  - Winter squash – best cut above stem
  - OK to twist summer squash



# Harvesting Herbs and Veggies

- Clip using sanitized clippers, kitchen shears, knife or fingers
- Cut main broccoli head, then harvest side shoots and leaves for 6 to 8 weeks
- Pinch off basil flowers to prolong leaf production
- Sustain harvest of leafy crops by harvesting outside leaves frequently



# Storage and Preservation Considerations

## Short-Term and Long-Term

- Large trees/vines can produce several hundred pounds of produce
  - Do you have time to process? Can, dry, ferment, pickle or freeze?
  - Check your available freezer space
  - Air dry (herbs), oven dry, sun dry or use dehydrator (tomatoes, cantalope)
  - Consider short-term refrigerator space before harvesting begins



# Key Storage Requirements

Depends on product:

- **Store in refrigerator:** most fruits, vegetables and herbs
- **Ripen on counter, then refrigerate:** primarily stone fruits and avocados
- **Store at room temperature:** many tropicals, basil, some vegetables
- Most produce will store longest if harvested in the cool AM hours





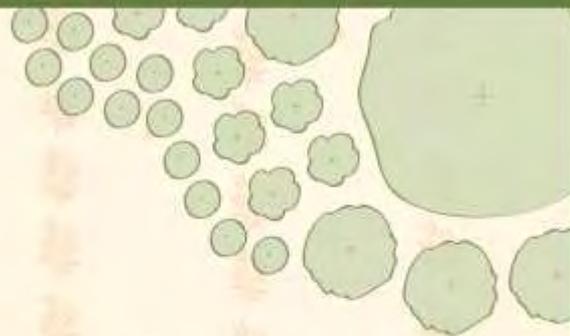
# What about Storing Vegetables?

## VEGETABLE GARDENING AT A GLANCE: HOW TO PLANT AND STORE

Vegetable	Recommended planting dates <sup>a</sup>				General planting requirements				Storage conditions		
	North and North Coast	South Coast	Interior Valleys	Desert Valleys	Crop type <sup>b</sup>	Amount to plant (4 persons)	Distance in inches <sup>c</sup> between plants in rows (cm)	Distance in inches <sup>c</sup> between rows (no beds) (m)	Best temp °F (°C)	Time length (weeks)	How to preserve <sup>d</sup>
artichoke <sup>e</sup>	Aug–Dec	May–Jul	Jul	Sep	C	3–4 plants	48 (122)	60 (1.5)	32 (0)	1–2	freeze whole, can, dry, or freeze hearts
asparagus <sup>e</sup>	Jan–Mar	Jan–Feb	Jan–Feb	Feb–Apr	C	30–40 plants	12 (31)	60 (1.5)	32 (0)	3–4	can, dry, or freeze
beans, lima <sup>f</sup>	May–Jun	May–Jun	May–Jun	—	W	15–25-ft row	6 (15) bush; (4.5–7.5-m row)	30 (0.8) 24 (61) pole	40 (4)	1–3	can, dry, or freeze
beans, snap <sup>f,g</sup>	Jul; May–Jun	Mar–Aug	Apr–May; Jul–Aug	Jan–Mar; Aug	W	15–25-ft row (4.5–7.5-m row)	3 (7.5) bush; 24 (61) pole	30 <sup>h</sup> (0.8)	45–55 (7–13)	1–2	can, dry, or freeze
beets <sup>f,g</sup>	Feb–Aug	Jan–Sep	Feb–Apr; Aug	Sep–Jan	C	10–15-ft row (3–4.5-m row)	2 (5)	18 <sup>h</sup> (0.5)	32 (0)	3–10	can, dry, or freeze
broccoli <sup>e, f,g</sup>	Feb–Apr; Aug–Sep	Jun–Jul; Jan–Feb	Dec–Feb; Jul	Sep	C	6–10-ft row (2–3-m row)	12–18 (30–45)	36 (0.9)	32 (0)	1–2	dry or freeze
brussels sprouts <sup>e</sup>	Feb–May	Jun–Jul	—	—	C	15–20-ft row (4.5–6-m row)	24 (61)	36 (0.9)	32 (0)	3–4	dry or freeze
cabbage <sup>e,f</sup>	Jan–Apr; Jul–Sep	Aug–Feb	Jul; Feb	Sep–Nov	C	10–15 plants	24 (61)	36 (0.9)	32 (0)	12–16	dry or freeze
cabbage, Chinese <sup>f</sup>	Jul–Sep	Aug–Oct	Aug	Aug–Nov	C	10–15-ft row (3–4.5-m row)	6 (15)	30 <sup>h</sup> (0.8)	32 (0)	2–3	dry or freeze

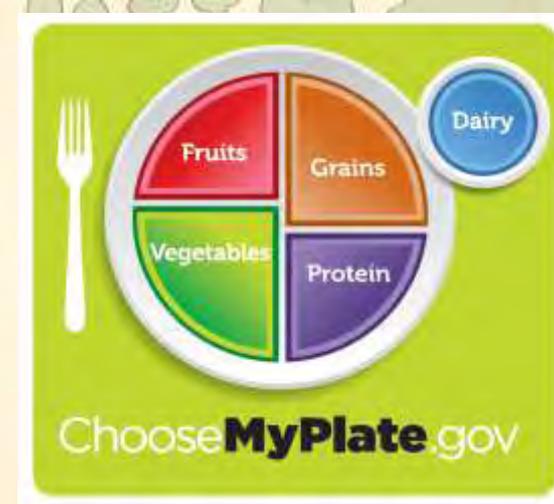
# Food Safety

Edible  
Landscaping

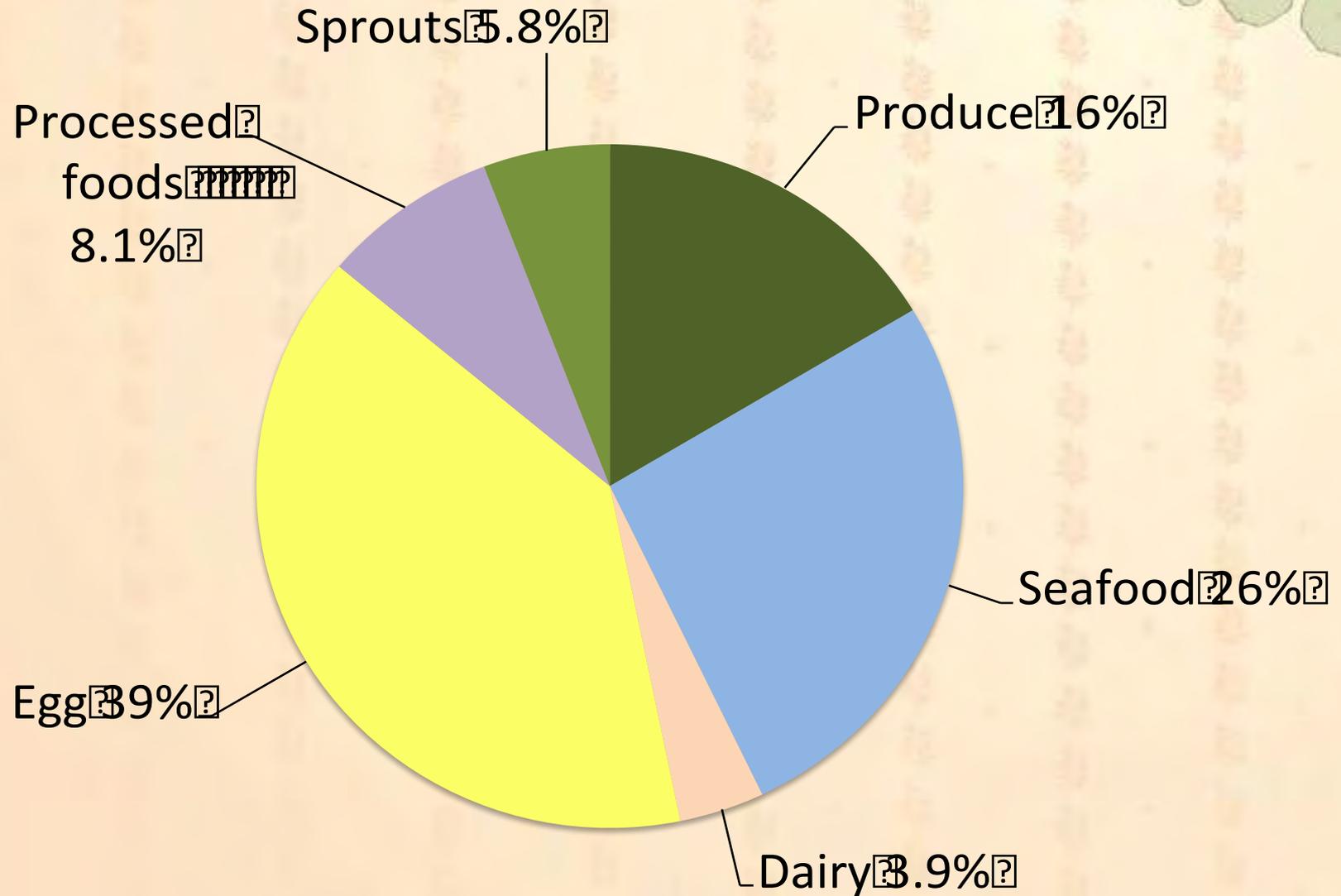


# Key points

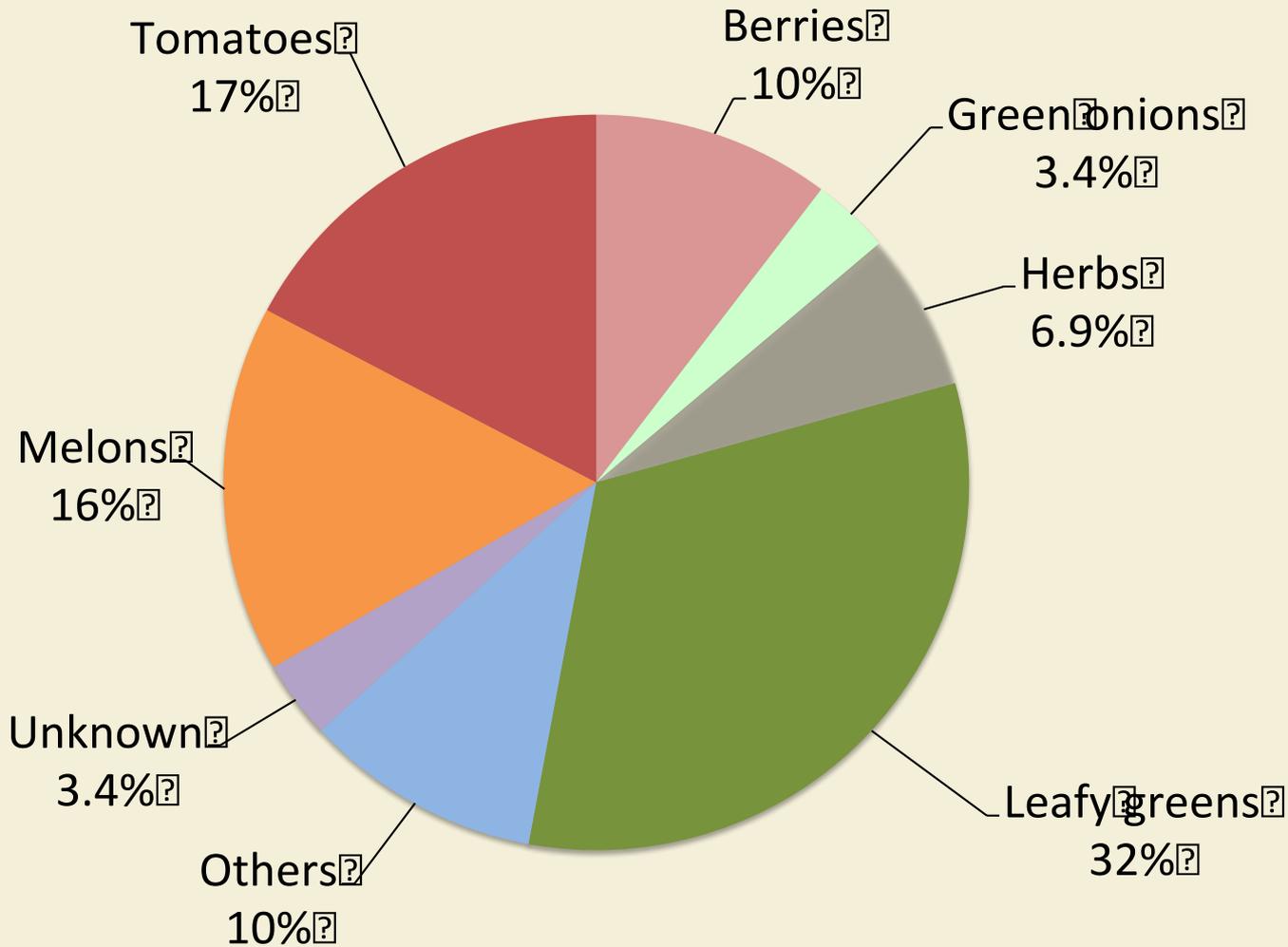
- Fruits and vegetables are a very important part of a healthy diet
- Fruits and vegetables can be a source of foodborne illness
- Common sources of foodborne pathogens (microorganisms that cause illness) in produce include:
  - Water
  - Animals: wild and domestic, including humans
  - Soil amendments (especially animal-based)
- **Preventing contamination is key**
  - Evaluate and mitigate risks from pre-plant to harvest of the of the edible landscape.



# Reported outbreaks of foodborne illness linked to FDA-regulated foods by vehicle 1996-2009 (N=532 outbreaks)



# Types of produce associated with outbreaks of foodborne illness 1996-2009 (N=87)



*E. coli* O157:H7



*Salmonella* spp.



*Listeria*



Hepatitis virus



# Good Agricultural Practices

- Focus is on RISK REDUCTION
  - Prevent contamination where possible
- Main sources of foodborne pathogens
  - Water
  - Wildlife and domestic animals, **including humans**
  - Soil amendments
    - *especially those derived from animals*

# Microbiological Safety of the Edible Landscape



## Planning

- Site Selection
- Water Source
- Facilities: toilets and handwashing



## Growth(PreHarvest)

- Water
- Soil Amendments and Supplements
- Animal access



## Harvest

- Personal Hygiene and Handwashing
- Cleaning and Sanitation



## Post Harvest

- Washing Produce
- Food Storage and Preservation

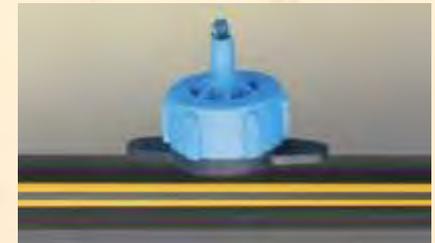


# Food Safety and Site Selection

- Know the history of the land
  - Risk assessment of prior use
  - Pesticide, cattle, poultry uses
- Consider the neighbors
  - Zoning in surrounding areas
  - Present and future use
- Existing structures/equipment
  - Septic tanks, plumbing access
  - Toilets

# Method of Water Application

- Foliar application (spray)
  - Water in contact with edible parts
  - Use water from a safe source
- Soil application (trickle, drip)
  - May lower risk, if properly maintained



Water used to mix solutions or chemicals that contact the edible plant must be potable!

# Soil Amendments

## ■ Compost

### ■ Animal sources (manure)

- Potential source of high levels of pathogens

- Properly composted or heat treated

- **Manure from pigs, dogs, and cats must not be used**

  - parasites may remain viable after composting

- Vegetative matter (no animal manure)

## ■ Green manures

- Plant matter grown and chopped and incorporated into soil



# Un-composted Manure

- Routes of infection
  - Hand to mouth contamination
  - Consumption of contaminated produce



# Tools, Equipment and Personal Protective Items

- Keep gloves clean and tools well maintained
- Consider designating tools for specific tasks
  - Chemical use / Compost / Harvest
- Wash and sanitize **harvest tools:** (clippers, knives, scissors)
  - Dishwasher, then lubricate
  - Alcohol wipes (Sani Wipes or other brand)
  - 1T bleach/gallon water, then lubricate



# Food Safety and Pesticide Residues



# How to Wash Produce

Just before storing or consuming, wash hands, sanitize brushes, work surfaces, cutting boards and knives.

Scrub or rub fruits and vegetables with a brush or hands under running water.

Dry produce with paper towels before storage.

Transfer to a sanitary container.



# Long-Term Storage

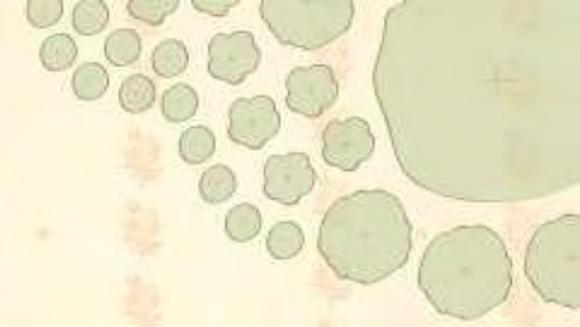
- Several methods of home preservation
  - Freezing
  - Drying
  - Fermentation
  - Pickling
  - Canning
  - Jams and Jellies



- UC home preservation and storage publications
  - [www.ucfoodsafety.ucdavis.edu](http://www.ucfoodsafety.ucdavis.edu)

# Thank you!

- Any Questions?





# Edible Landscaping

## Planning & Designing Edible Landscapes

Bill Maynard  
Master Gardener  
UC Cooperative Extension



Image Source: C. Napawan

# Edible Landscape Types:

*Balancing productive uses with existing landscape uses*

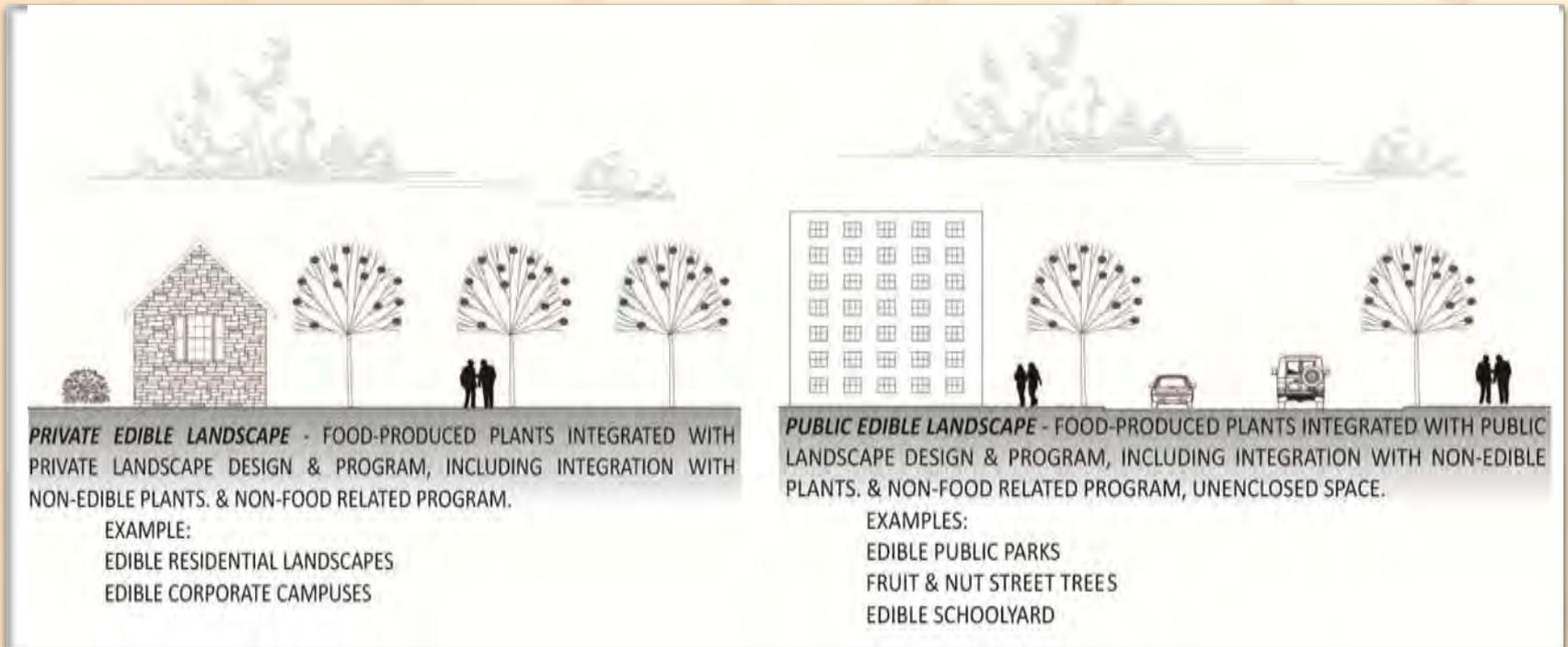


Image Source: C. Napawan

# Edible Landscape Types

Residential



Educational



Institutional



Public

# Edible Residence



Edible estates, various locations in US and UK  
Fritz Haeg, Artist

Image Source: "Carrot City" by M. Gorgolewski

Southwark, London  
Council Housing Garden



Image Source:  
“Carrot City” by M. Gorgolewski

# Edible Rooftop

Gary Comer Youth Center Rooftop, Chicago, IL  
Hoerr Schaudt Landscape Architects

8,160 SF



Image Source: "Carrot City" by M. Gorgolewski

# Edible Rooftop

Gary Comer Youth Center Rooftop, Chicago, IL  
Hoerr Schaudt Landscape Architects

8,160 SF

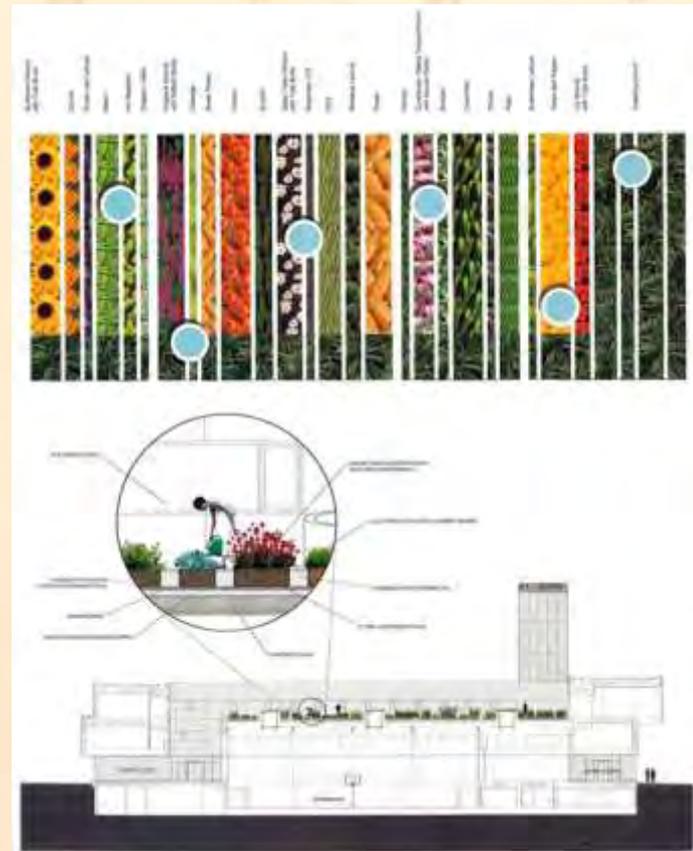


Image Source: "Carrot City" by M. Gorgolewski

# Edible Schoolyard

Sacred Heart School, Atherton, CA  
SWA Group, Sausalito, CA

0.25 Acres



Image Source: SWA Group

# Edible Schoolyard

Sacred Heart School, Atherton, CA  
SWA Group, Sausalito, CA



Image Source: SWA Group

# Edible Schoolyard

Sacred Heart School, Atherton, CA  
SWA Group, Sausalito, CA



Image Source: SWA Group

# Edible Streetscape

Russell Street olive grove, UC Davis  
City of Davis, Davis Olive Center

Approx. 1 Mile

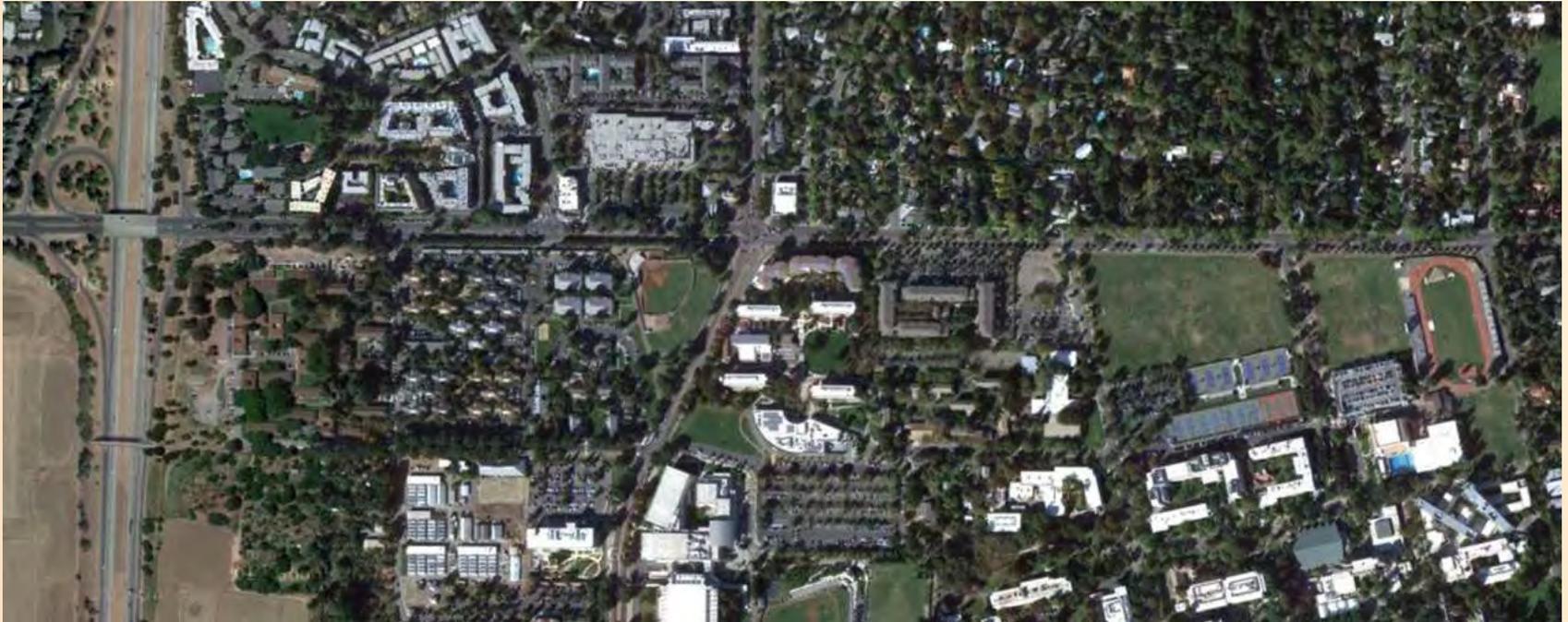


Image Source: Google Earth

# Edible Streetscape



Image Source: C. Napawan

# Edible Development

Mixed-Use Development, Stockton, CA  
SWA Group, Sausalito, CA

137 Acres



Image Source: SWA Group

# Assessing Client & Users

## *Addressing Client & User Conditions*



Image Source: [www.dwylandscapearchitects.com](http://www.dwylandscapearchitects.com)

# Addressing Existing Conditions: *California's Varied Climates & Growing Regions*



Image Source: Adapted from Vossen, 2002

# Addressing Existing Site Conditions:

## *Resource Availability*

- Soil – Identify if adequate soil exists on-site; confirm safety of soils for edible plants by soil testing, if located in potentially contaminated site; identify appropriate plants for soil type & condition (soil amendments discussed in forthcoming section).
- Water – Identify availability of water on-site; confirm average volumes of available water; identify appropriate edible plants for water availability; determine appropriate irrigation method for water availability & desired plants (irrigation techniques & water policies discussed in forthcoming sections).
- Solar Energy – Evaluate the site's cardinal orientation and immediate adjacencies; identify appropriate plants for solar conditions present; for more detailed information on sun/shade studies:
- Waste Management – Evaluate sites' ability to handle green waste through composting; identify

# Addressing Existing Site Conditions: *Solar Energy*

- <http://www.nrel.gov/midc/solpos/solpos.html>
- <http://aa.usno.navy.mil/data/docs/AltAz.php>

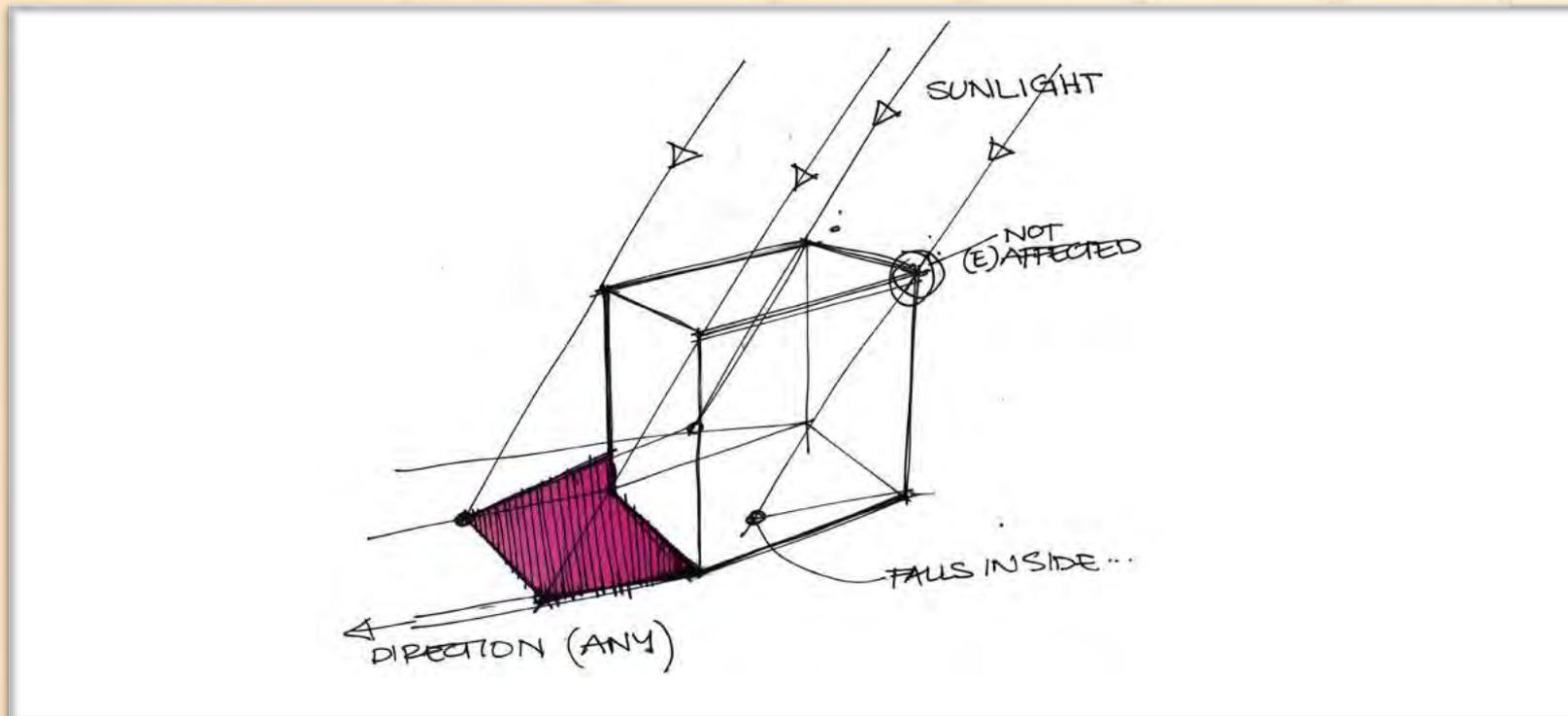
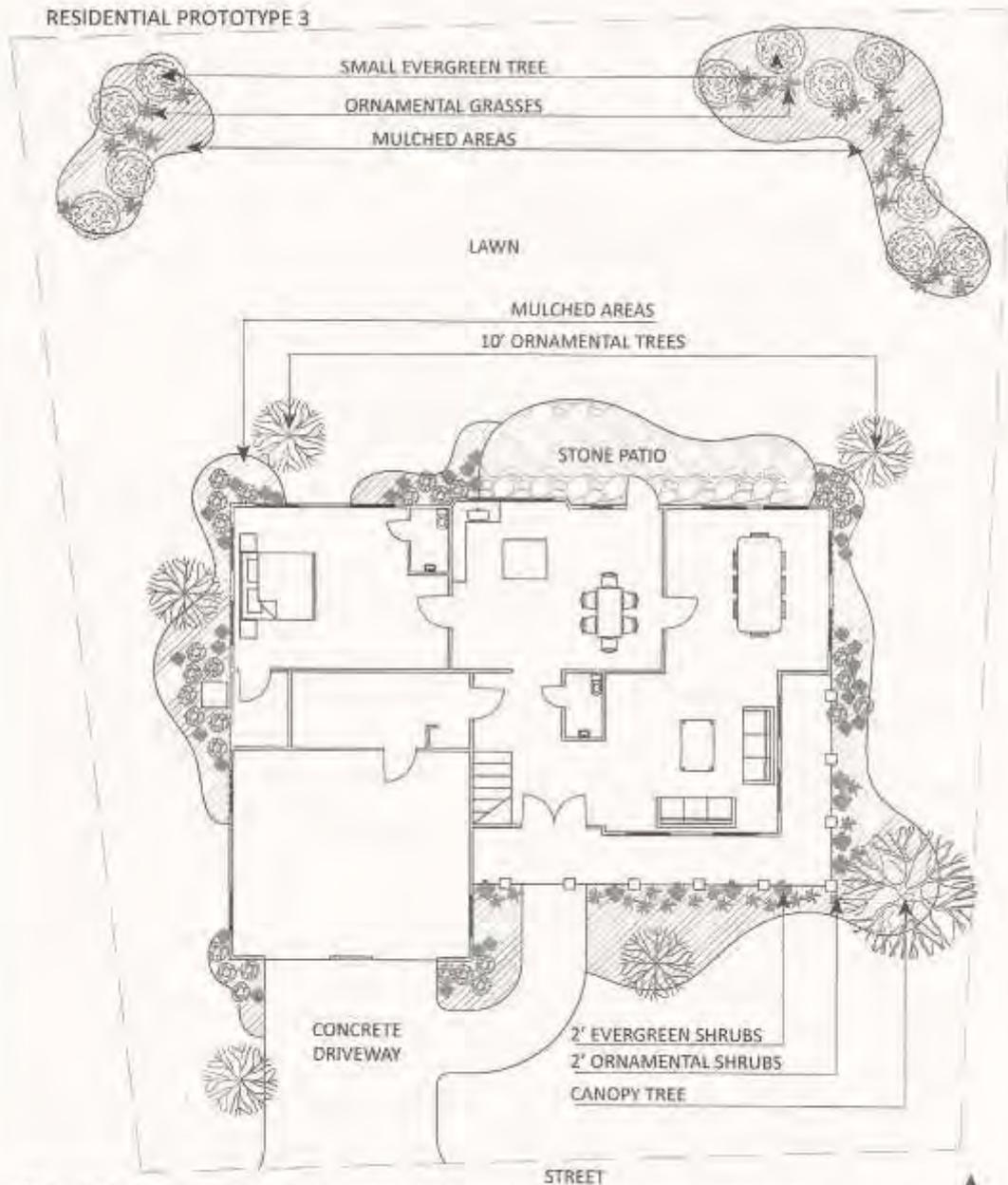


Image source: <http://www.idsketching.com/basic/toolbox-shadows/>

# Assessing Site, Client & Program Addressing Existing People and Place Considerations

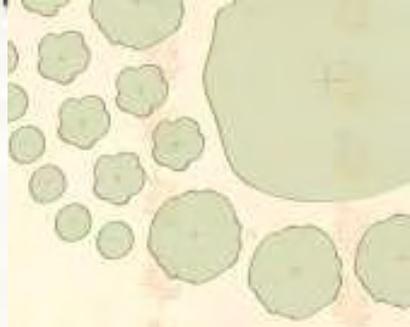
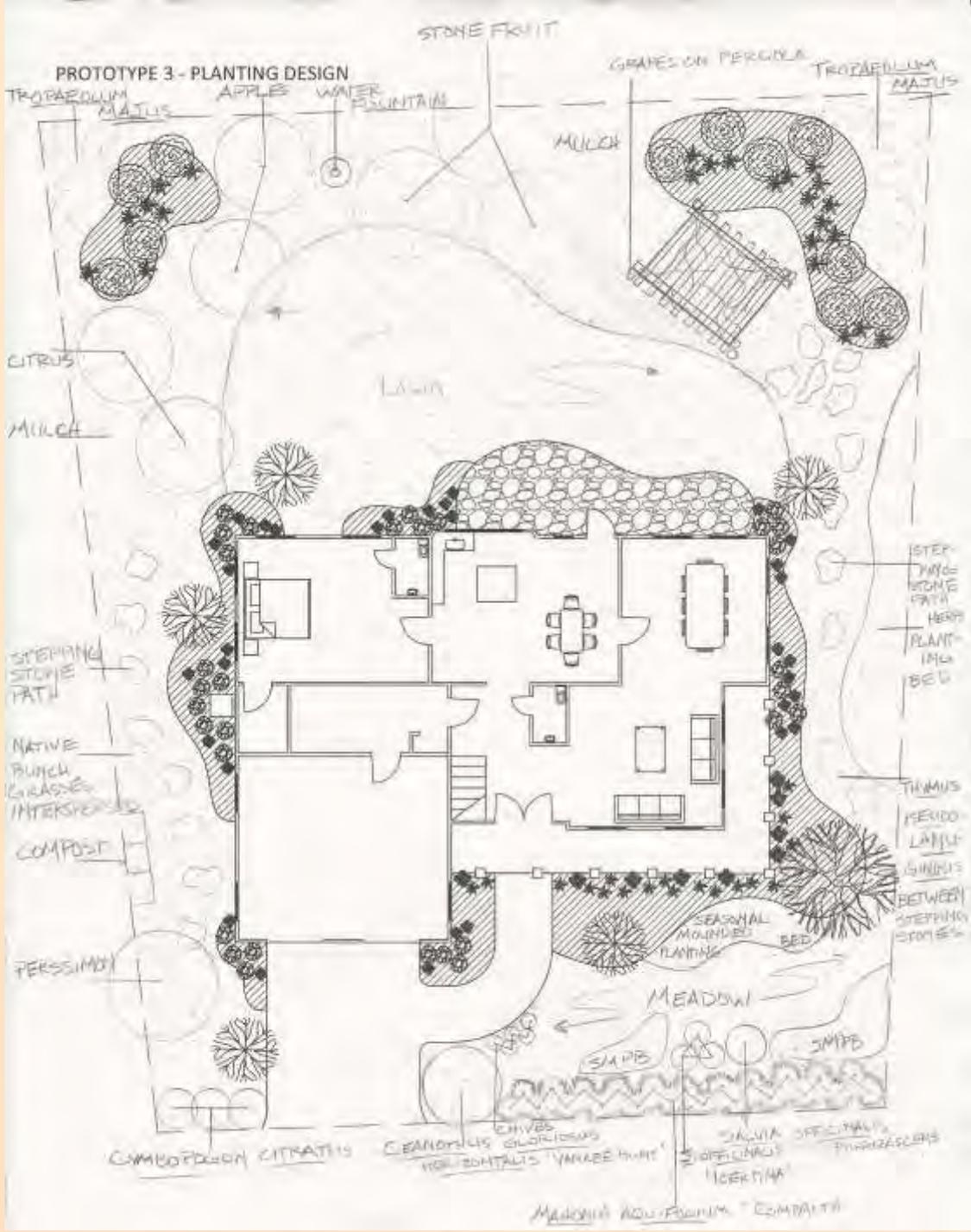


This single-family residence is located on a cul-de-sac with similar residences surrounding. Homeowners are interested in reducing the amount of lawn throughout the irrigated landscape, and replacing with edible plants. Maintenance of landscape is provided by hired professionals.

NORTH  
SCALE 1"=10'-0"



# Assessing Site, Client & Program Developing Alternatives



# Designing for What You Want

*Using Space to Inform Use, Improve Function and Create a Sense of Place*

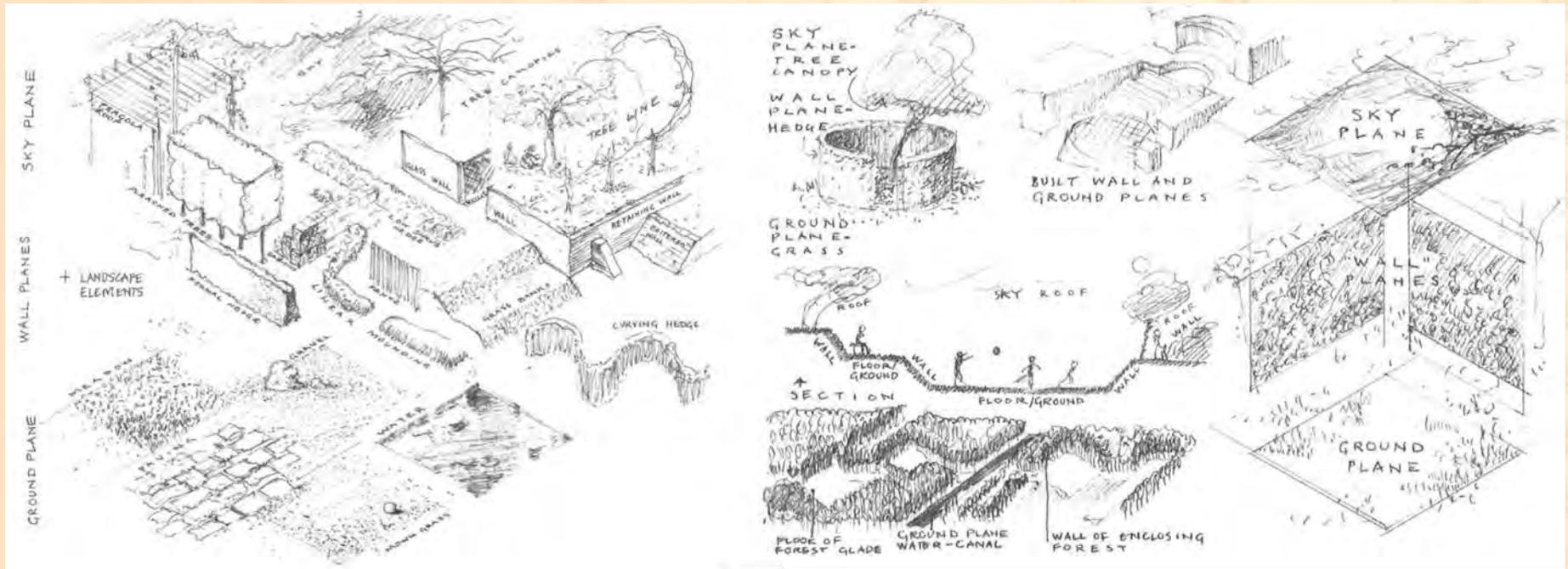


Image Source: "Form & Fabric in Landscape Architecture" by C. Dee

# Designing the Layout

## *Using Plants to Define Space*

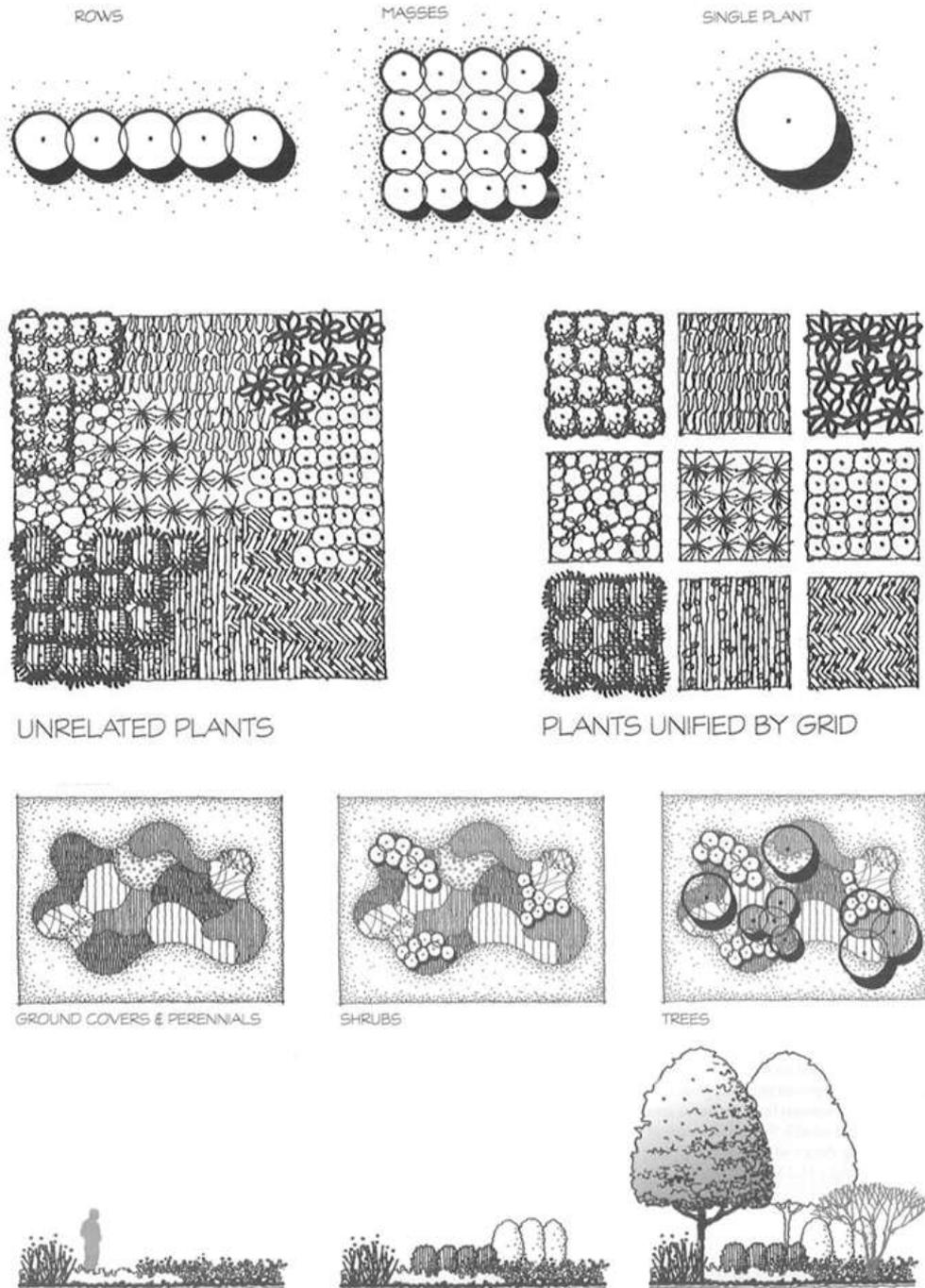
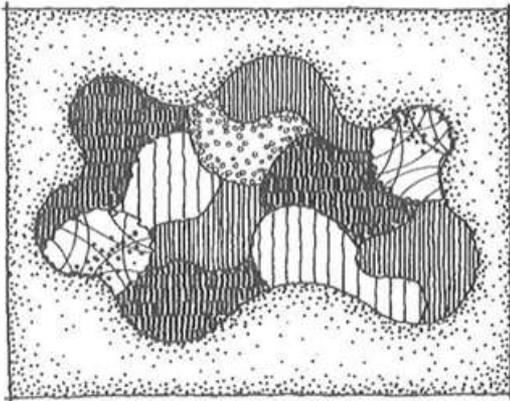


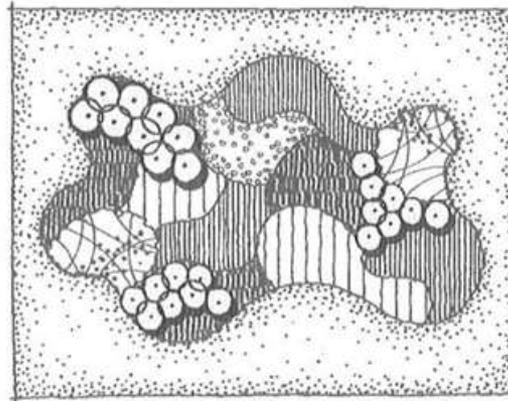
Image Source: "Form & Fabric in Landscape Architecture" by C. Dee

# Designing a Planting Palette

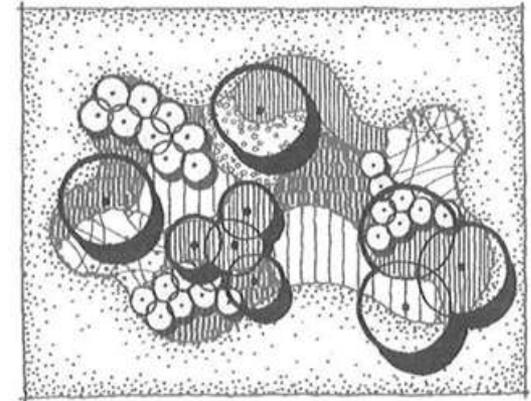
## *Reconnecting to Site and Program Assessment*



GROUND COVERS & PERENNIALS



SHRUBS



TREES

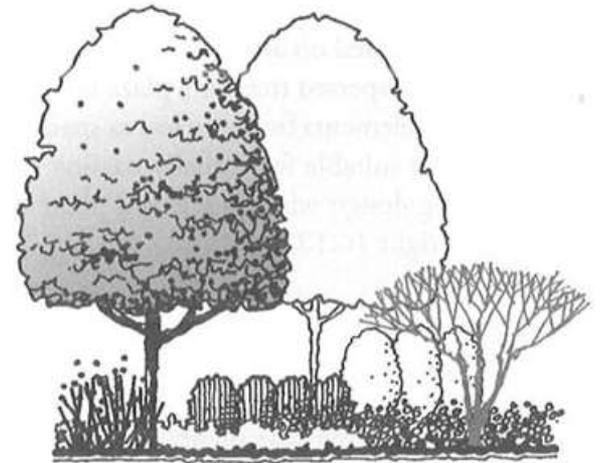
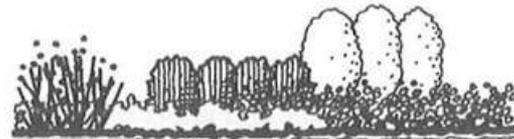


Image Source: "Form & Fabric in Landscape Architecture" by C. Dee

# Designing a Planting Palette

## *Space-Making Through Edible Plants*

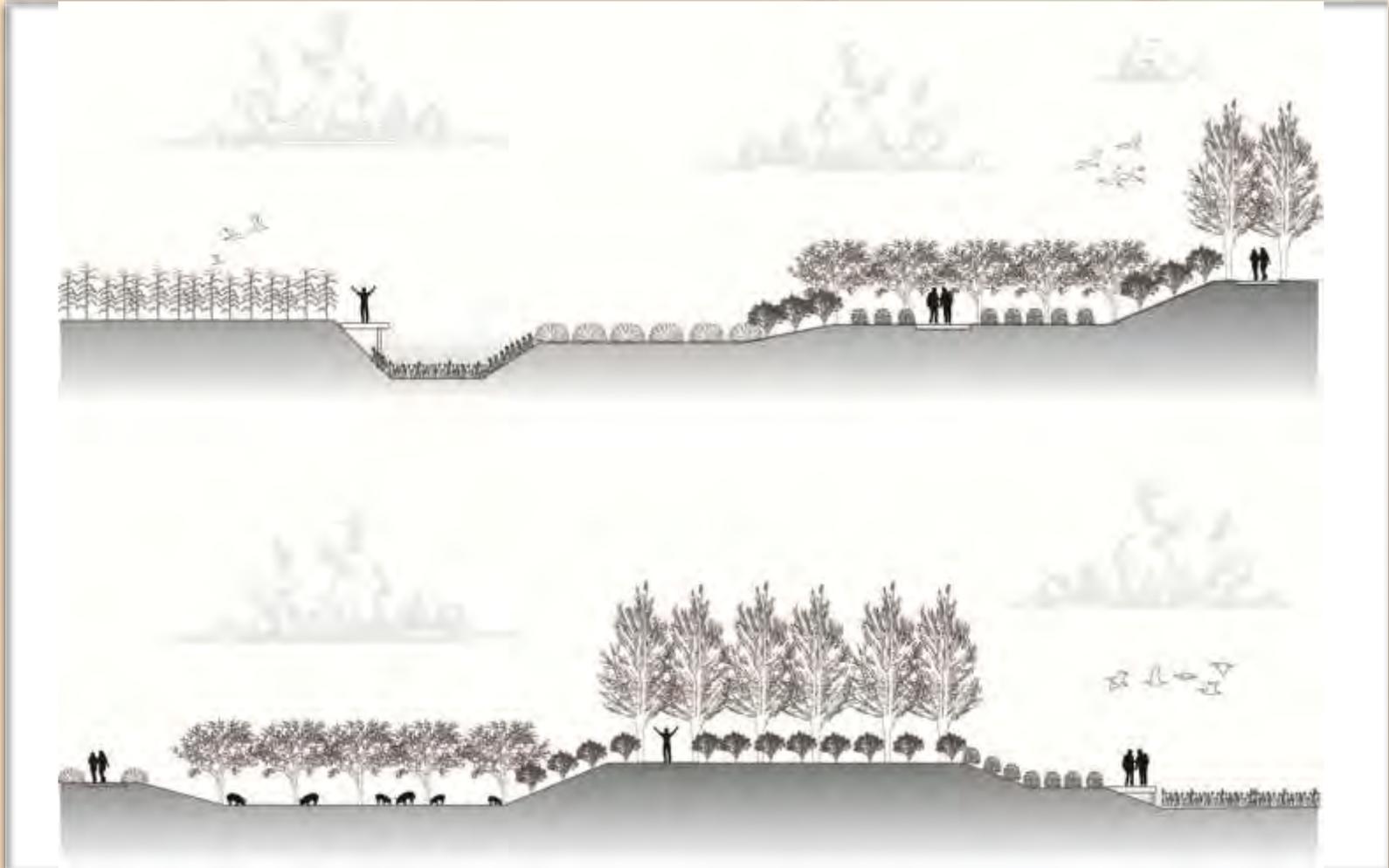


Image Source: C. Napawan

# Space Considerations

Beacon Food Forest, Seattle, WA  
Harrison Landscape Architects

7 Acres

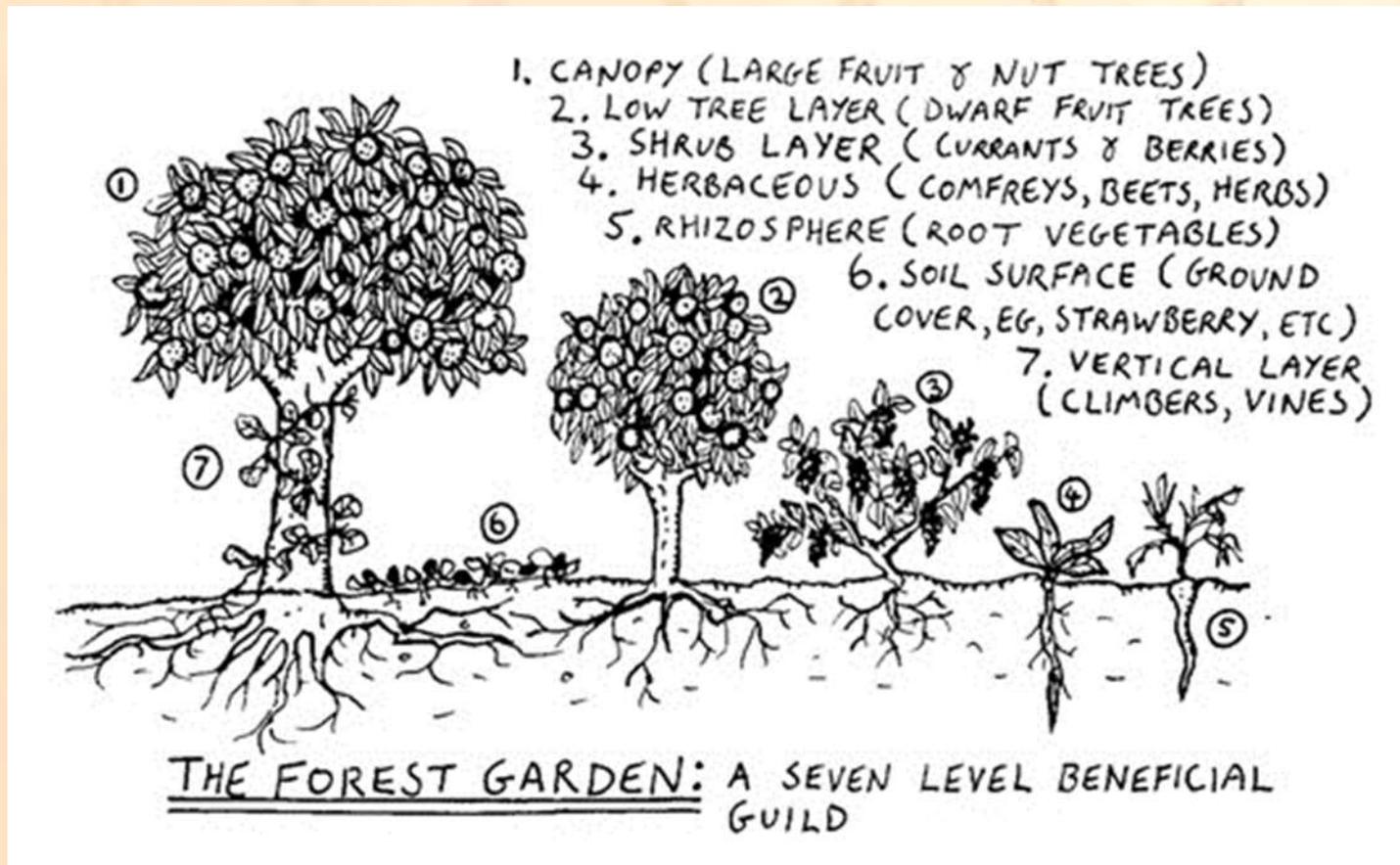


Image Source: <http://beaconfoodforest.weebly.com/>

# Edible Public Park

Beacon Food Forest, Seattle, WA  
Harrison Landscape Architects

7 Acres



Image Source: <http://beaconfoodforest.weebly.com/>

# Edible Public Park

Beacon Food Forest,  
Seattle, WA  
Harrison Landscape  
Architects

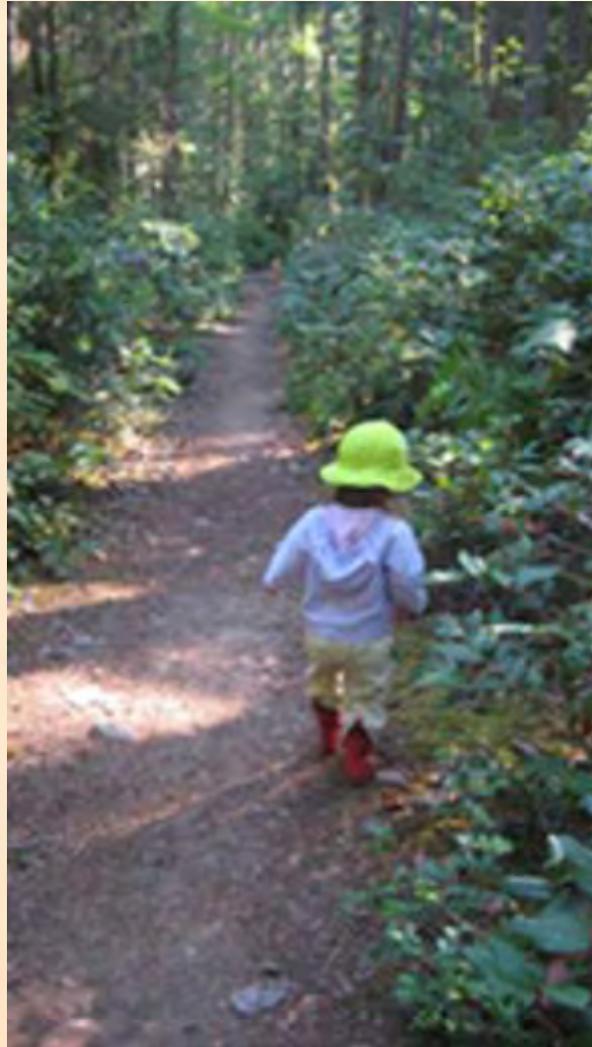


Image Source: <http://beaconfoodforest.weebly.com/>

# Edible Landscape Components: *Recognizing Plant Forms and Symbiotic Design Opportunities*

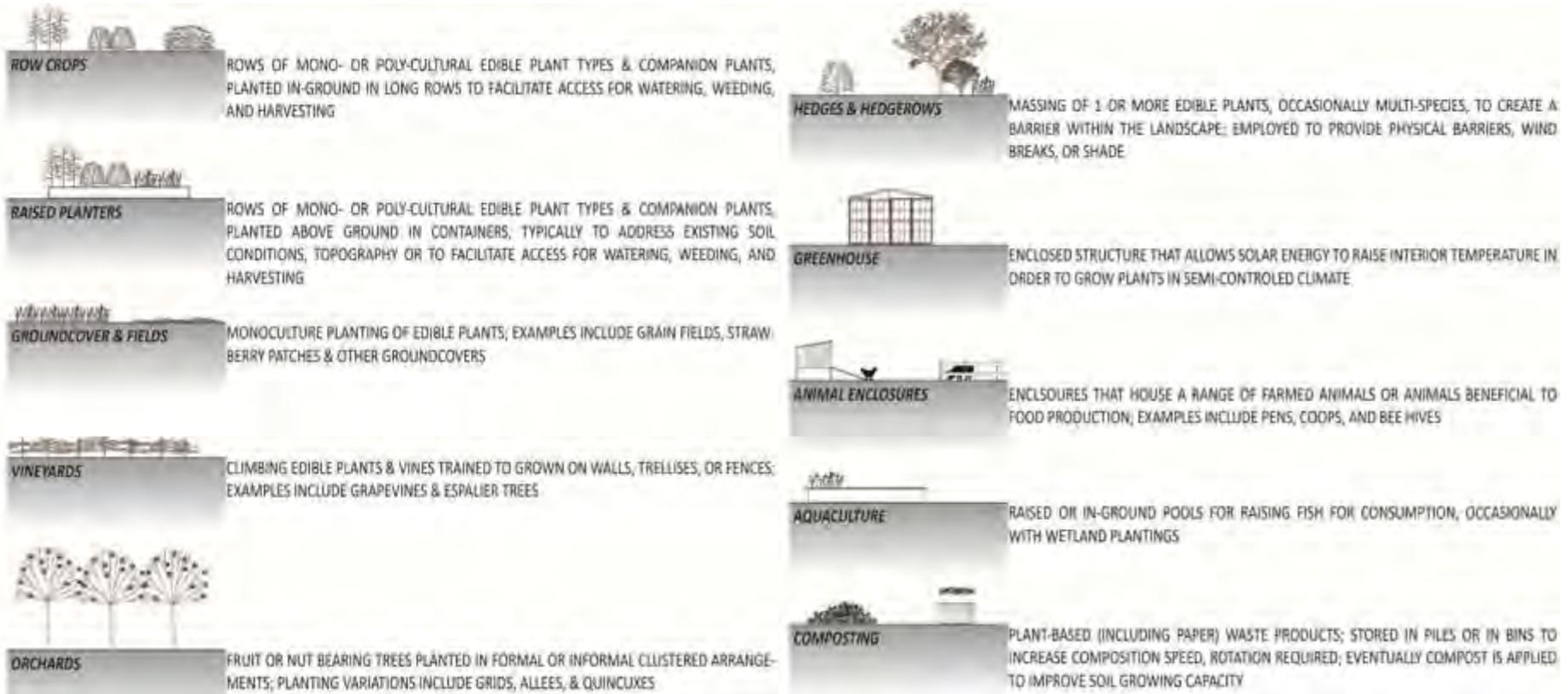


Image Source: C. Napawan

# Container Planting



Image Source: C. Napawan



RAISED PLANTERS

# Carpets



Image Source: C. Napawan



GROUNDCOVER & FIELDS

# Walls



Image Source: C. Napawan

# Columns and Canopies



Image Source: C. Napawan

# Designing for Beauty

*A Garden Loved is a Garden that Lasts*



Image Source: C. Napawan

# Integrating Edibles into Common Areas

Descano Public Demonstration Garden



Image Source: "Carrot City" by M. Gorgolewski

# Educational Role

*Shaping Space, Informing Use, and Changing Habits*



Image Source: C. Napawan

# Educational Role

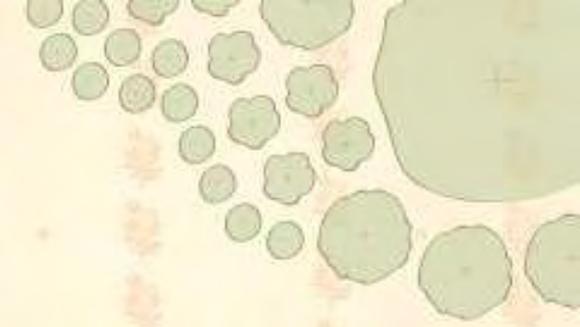
*Food can build Community: Davis Farmer's Market*



Image Source: <http://ucanr.org/>

# Thank you!

- Any Questions?



The slide features a light beige background with a dark green border. In the top-right and bottom-left corners, there are clusters of stylized green tree icons of various sizes and shapes, some with small crosses in their centers. The main title is written in a dark red, cursive font.

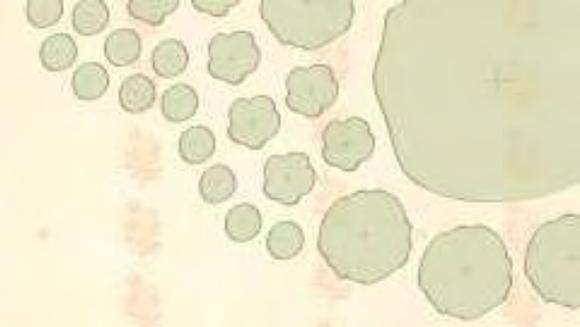
# Edible Landscaping

## Fruit Trees and the Edible Landscape

Patricia Petersen  
Master Gardener  
UC Cooperative Extension

# Fruit Tree Considerations in Edible Landscapes

- Allow enough room to prune, thin, and harvest
- Roots will spread 2 to 3 times the width of the canopy
- Consider effects of sprays on adjacent plants
- Consider clustering fruit trees and keeping them small
  - Similar irrigation, bird netting, mulching, pollination



# Low-Maintenance Fruit Species

- Cane berries and blueberries
- Citrus (for now)
- Figs
- Jujubes
- Persimmons
- Plums and pluots
- Pomegranates

Persimmon



# Serious Problems with Some Fruit Trees

- Apples and pears – Fire blight, codling moth
- Apricots – Brown rot, bacterial canker
- Cherries – Spotted-wing Drosophila
- Citrus – Asian citrus psyllid, citrus greening, scale insects, frost
- Peach/nectarines – Peach leaf curl
- Grapes – Powdery mildew



# Fruit Problems – Solutions Tested



Agribon row cover for spotted-wing Drosophila on cherry

Row cover on branch –  
Peach leaf curl trial



# Peach Leaf Curl Trial – Individual Branches Treated

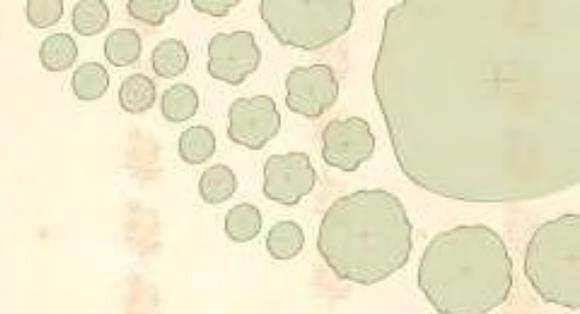


Sprayed individual branches



Untreated

Lime sulfur



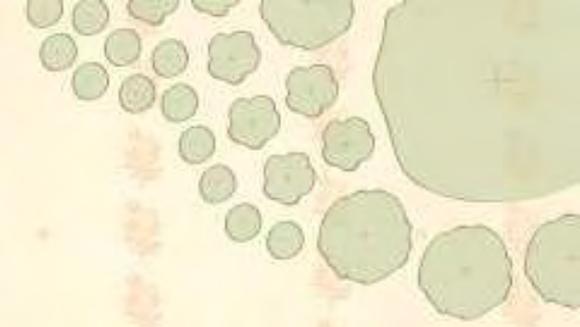
# Results

## Control of PLC severity compared to untreated

- Agribon alone: < 60% control
- Liquicop: 70% control
- Copper soap: 80% control
- Nearly complete control:
  - Agribon + Liquicop
  - Lime sulfur / Microcop

# Fruit Trees: Aesthetics vs. Production

- Depends on your interests; should be a balance
- Tall vs. short
  - Short trees easier and safer to manage
    - Use genetic dwarf or dwarfing rootstock
  - Tall trees aesthetically pleasing, provide fruit for wildlife too
    - Weight of fruit may bend branches down, may break
    - Pests harder to manage, spraying difficult
    - Fruit drop may become problematic



# Standard Trees Often Get Too Tall!



Fruit tree incorporated in  
landscape, but not well thought  
out

High branches in tall fruit trees  
are often unmanaged, and  
often break



# Persimmon Tree in Yard



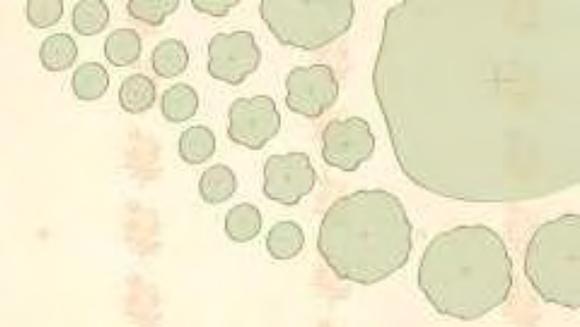
Before pruning



After pruning

# Site Selection

- 6 to 8+ hours of full sun
- Shelter from high winds
- Some trees may benefit from warm south wall
- Avoid planting where fruit falls on walks or driveway
- Soil should be at least 2 to 3 feet deep



# A Fenced “Front Yard” Orchard

- Productive, but not so attractive



# Incorporating Fruit Trees into Designs



# Site Selection Issues



Wind protection, full sun,  
fruit falls on walkway



Some shading, bird netting



# Site Selection Issues – Dwarf Peach



Wind protection, warm south wall, blends into landscape



Full sun, a bit out of place but still works

# Site Selection Issues – Large Trees, Frost Protection



Front entrance orange tree – too big  
to cover, fruit falls on walkway



Pomegranates do best with  
plenty of room

# Sculpted Fig Tree in Parterre Garden



# Espalier Pruning

## *Growing Season*



Source: Pruning & Training (American Horticultural Society)

# Dwarf Citrus Espalier (Mandarin)



# Custom Espalier Fence

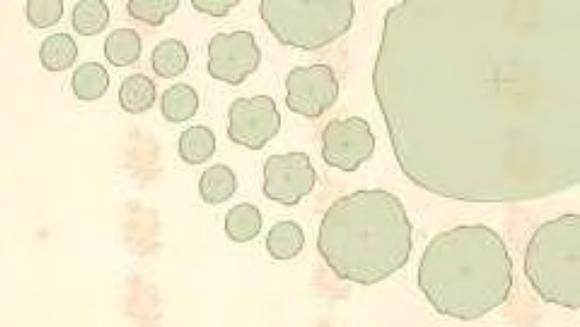


# Fig Espalier



# Planting Fruit Trees

- Check roots, cut off dead or damaged
- Hole size: wide, and deep if compacted
- Plant on mound to keep crown dry
- Plant high! – reduces chances of crown and root rot
  - Graft union well above soil
  - Previous soil line at or above soil level
  - Allow for soil settling



# Planting a Bare Root Tree



Dig hole  
to fit roots



Lightly tamp soil

Emitters  
1 foot away



# Planting a Containerized Tree



Pull out  
wound roots



Don't cover soil  
in pot



Water in

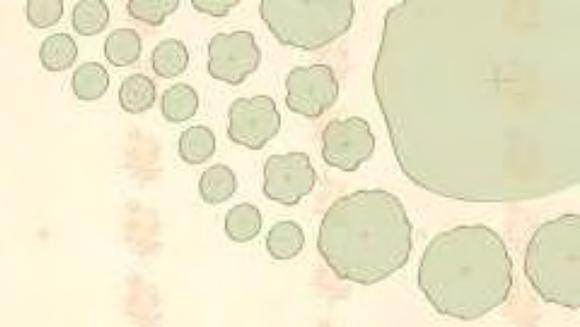
# Post-Planting Care

- Head tree at 18 to 36 inches (bare root only)
- Cut back a few well-placed laterals to 3 to 8 inches, remove all others
- Paint trunk white
  - Interior latex paint and water, 50:50
  - Entire trunk plus 2 inches below soil
  - Prevents sunburn and borers



# Thank you!

- Any Questions?



# Edible Landscaping

## Citrus and Grapes in the Edible Landscape



Bill Krycia  
Master Gardener  
UC Cooperative Extension

# Edible Landscaping, Citrus!

Citrus

History

Requirements

Care

Selection and use



# Edible Landscaping, Citrus!

## ■ History

- Citrus have been used in landscaping for hundreds of years
- In California for over 100 years



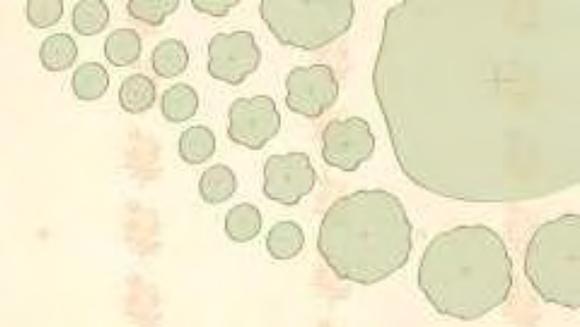
# Edible Landscaping, Citrus!

- Requirements
  - Minimum of 8 hours of sun
  - Appropriate irrigation
  - Good drainage
  - Nitrogen, micronutrients
  - Heat, but not too much
  - Space



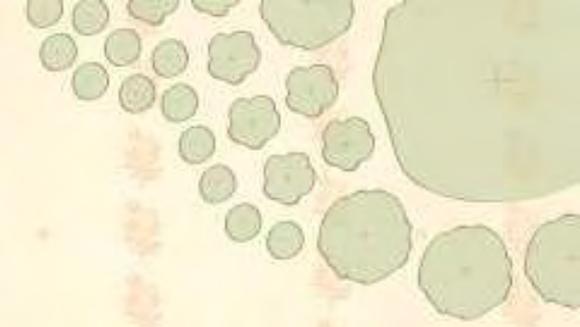
# Edible Landscaping, Citrus!

- Preferred areas
  - South facing side of house
    - Most sun and warmth
  - West side second warmest
  - Not in a lawn or other incompatible planting
- Cold air drainage
  - Plant preferably not in the lowest spot in the yard
  - Plant upslope on a south facing slope



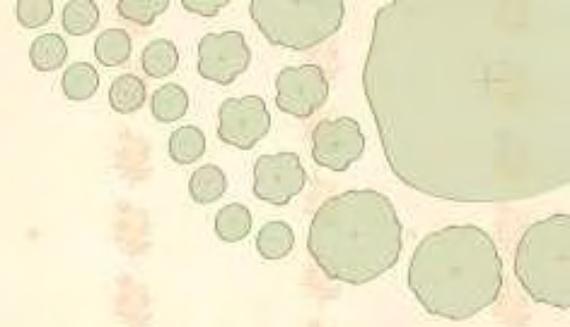
# Edible Landscaping, Citrus!

- Adequate irrigation
  - Check below surface
    - Too much water encourages a host of problems, including phytophthora root rot
  - Mulch
- Drainage
  - Ideally, check before you plant



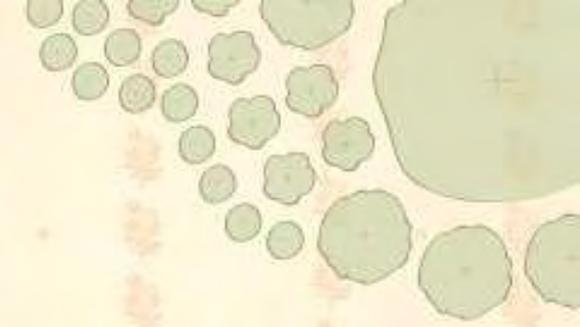
# Edible Landscaping, Citrus!

## ■ Selection



# Edible Landscaping, Citrus!

- Taste!
  - Something you like and will use
- Citrus provide
  - Form
  - Full season foliage
  - Color accents
    - Blooms
    - Fruit



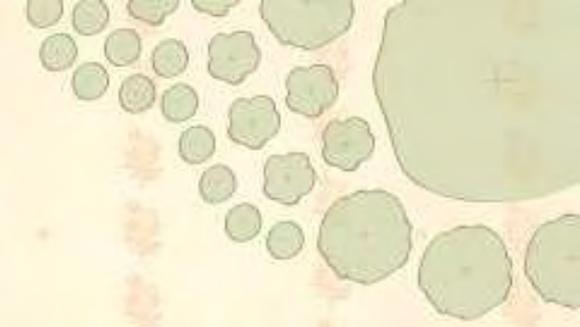
# Edible Landscaping, Citrus!

- Selection:
  - UC Riverside Citrus Variety Collection website
    - Photos give you an idea of the general tree shape, an idea of what the fruit looks like



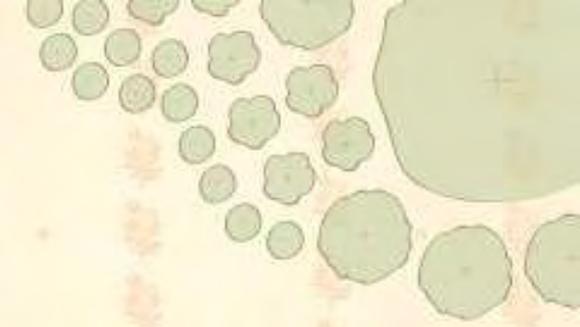
# Edible Landscaping, Citrus!

- UC ANR Publication 8472: *Tried and True or Something New*, selected citrus varieties for the home gardener.
  - Highlights some of the newer selections of citrus
    - Seedless!
      - Seedless Kishu
      - Tango
      - Gold Nugget
    - Extended season



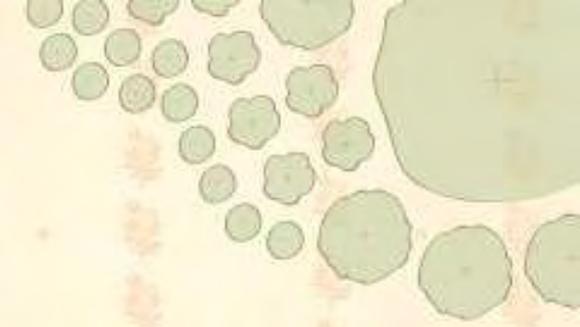
# Edible Landscaping, Citrus!

- Rootstock
  - Dwarf (Flying Dragon, Rich 16-6)
    - Tree size approximately half of full size
      - 6 to 8 feet for large trees
      - 4 to 6 feet kumquats, smaller citrus
  - Semi-Dwarf (C-35, trifoliolate)
    - Tree size approximately three quarters of full size
      - 15 feet
  - Full Size (Carrizo, others)
    - 20+ feet



# Edible Landscaping, Citrus!

- Pruning/shaping
  - Most citrus require little pruning, but...
    - Some mandarins may benefit from a light pruning, reducing the tendency for alternate bearing
    - Lemons seem to enjoy a light pruning
    - Pruning the lower section of the tree will reduce fruit load, watch out for sunburn
    - Espaliers can be done



# Edible Landscaping, Citrus!

- Frost Protection/tolerance
  - Certain varieties are more frost sensitive
    - (think either containers or access to power for lights)



# Edible Landscaping, Citrus!

- Use
  - Specimen plant
  - Hedge or border
    - Think about what you're going to do with the fruit
  - Accent



# Edible Landscaping, Citrus!

- Container citrus
- Portable
- Containers as accents
- Opens new areas







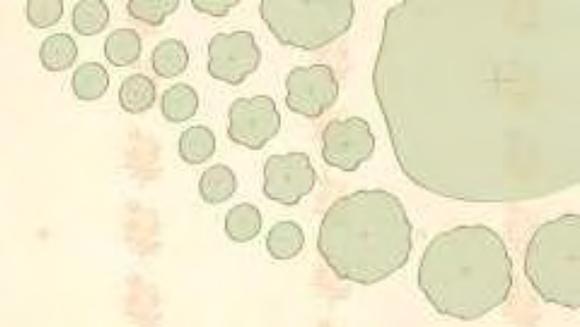
# Edible Landscaping, Citrus!

- In Ground
  - Shaping
    - Tree form
      - Skirt or no skirt
    - Shrub form
      - Limequats and kumquats
  - Espalier
    - “Against”
  - Hedge
    - 6 to 9 foot centers on trees



# Fruit Tree Considerations in Edible Landscapes

- Allow enough room to prune, thin, and harvest
- Roots will spread 2 to 3 times the width of the canopy
- Consider effects of sprays on adjacent plants
- Consider clustering fruit trees and keeping them small
  - Similar irrigation, bird netting, mulching, pollination
  - Similar frost protection requirements



# Fruit Tree Considerations in Edible Landscapes

- From Craig Kallsen's "Growing Citrus in Kern County":
  - Citrus trees are relatively large trees and should be planted at least 12 feet (more is better) from fences, walls and buildings. This rule is good even semi-dwarf citrus (which really can grow into a large tree).
  - True dwarf trees on 'Flying Dragon' rootstock can be planted 6- 8 feet from structures. Trees planted too close to structures will often lean and grow into light, become unbalanced, develop stress cracks in the trunk, and break or fall over.

# Serious Problems with Some Fruit Trees

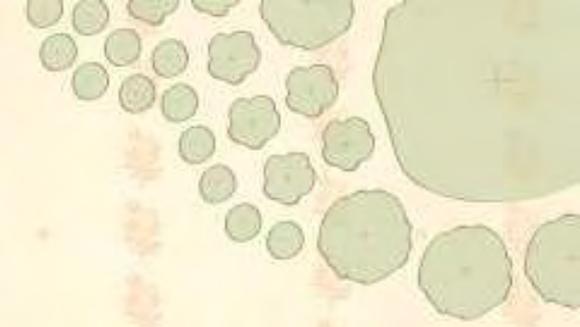
- Citrus – Asian citrus psyllid, citrus greening, scale insects, frost





# Edible Landscaping, Citrus!

- Questions and Discussion



# Edible Landscaping



Edible Landscaping, Grapes!

# Edible Landscaping, Grapes!

Grapes

History

Requirements

Care

Selection and use



# Edible Landscaping, Grapes!

- History
  - California Missions
- Well established throughout most of the state



# Edible Landscaping, Grapes!

## ■ Requirements

- Adapted to a wide range of soil types
- Sun
  - 6 to 8 hours a day
- Irrigation
- Drainage
- Support!
- Care



# Low-Maintenance Fruit Species

- Cane berries and blueberries
- Citrus (for now)
- Figs
- Jujubes
- Persimmons
- Plums and pluots
- Pomegranates



# Edible Landscaping, Grapes!

## ■ Care

- Staking/trellising
- Irrigation
- Fertilizing
- Pruning/training
- Suckering
- Leaf thinning
- Cluster thinning/tipping
- IPM/Spraying/Bird control



# Edible Landscaping, Grapes!

- Integrated Pest Management (IPM)
  - Powdery mildew control
  - Bunch rot
  - Grape leaf hoppers



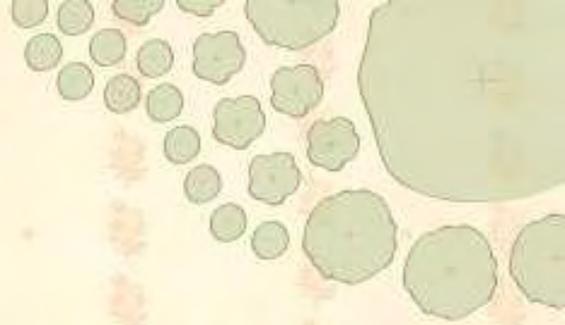
# Edible Landscaping, Grapes!

## ■ Selection

- Most grapes are vigorous growers!
- Most table grapes on own rootstock, most wine grapes on grafted rootstock

## ■ Taste

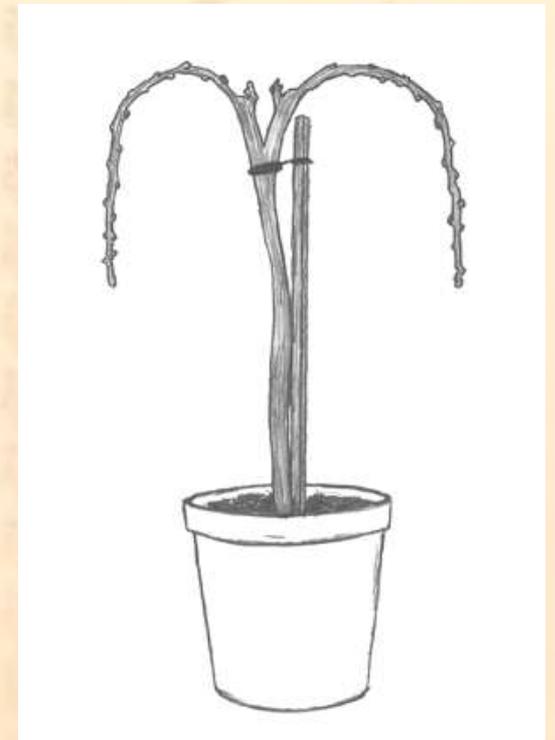
- Seedless or not?
- Ripening time
  - Varieties from mid-July through October



# Edible Landscaping, Grapes!

## ■ Use

- Arbors
- Trellised along a fence or structure
- Specimen planting
  - California head pruned
- Containers



# Edible Landscaping, Grapes!

- Arbors
  - Acceptable for either spur or cane pruning
  - Should be very durable!
  - Consider access for pruning, spraying, etc

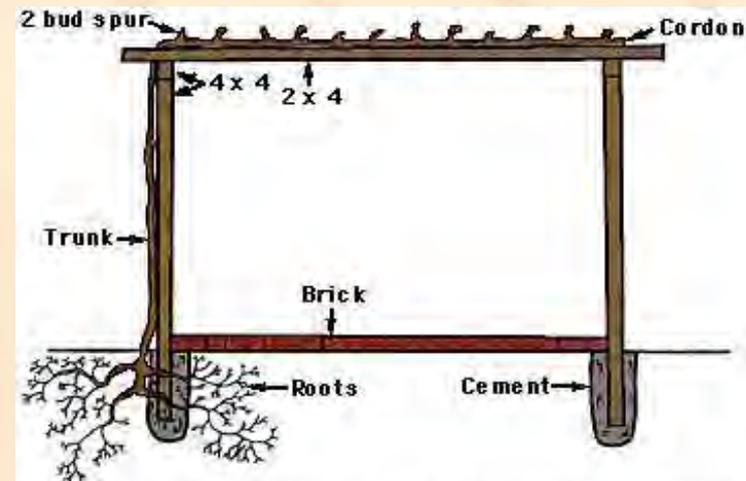
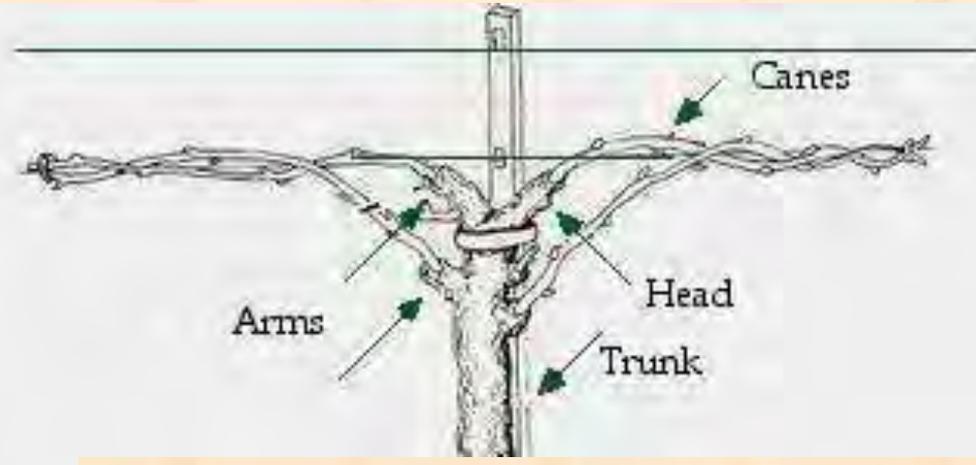
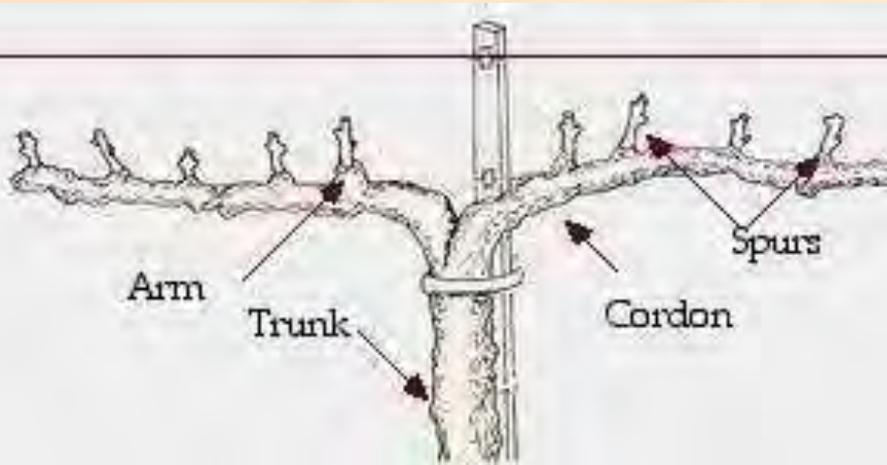


Figure 4. An end view of a grape arbor with a dormant mature vine pruned to an arbor cordon.

# Edible Landscaping, Grapes!

- Trellised
  - Support the plant
  - Durable
  - Access



## EDNA VALLEY VINEYARD

WWW.EDNAVALLEY.COM

### Row 3-Symphony

Symphony is a modern varietal developed at University of California, Davis in 1948 by crossing Grenache Gris and Muscat of Alexandria. These grapes make an off-dry white table wine and are also used for sparkling wine. See row 1 for a description of the **VSP** trellis.

### Row 4-Viognier (Clone 1)

Viognier is a white varietal originating from the Rhône Valley in France. Difficult to grow, Viognier grapes are prone to mildew, have very low yields and must be picked at the height of ripeness. The result is a wine of heady peach, floral and spice aromas. See row 1 for a description of the **VSP** trellis.

### Row 5-Syrah

Syrah is a red varietal from the Rhône Valley in France. Syrah is also known as Shiraz, the named favored by Australian and some American producers. The grape skins are black when fully ripe. The trellis design is a **Smart Dyson** system, which separates the canopy vertically. The vine is normally spur pruned, with half the shoots trained upwards and the other half positioned downwards, allowing the fruit to receive more sun exposure and reducing the need to pull leaves.

### Row 6-Pinot Noir (Clone 115)

Pinot Noir is the noble, red Burgundy varietal. This grape prefers a cooler climate and is moderately vigorous. The shoots tend to grow in a downward position as the season progresses. Clusters are small in size and cylindrical in shape. Berries are small and blue-black in color.

The trellis design is the **Scott Henry** system. Similar to the VSP, this design vertically separates the canopy but half the shoots are trained upwards and the other half downwards. The vine is cane pruned, with the upward shoots growing from the top cane while the downward shoots grow from the bottom cane.



Smart Dyson trellis system  
(Side View)



Scott Henry trellis system  
(Front View)

### Row 7 - Merlot (Clone 3)

One of the noble Bordeaux varietals from France, Merlot is a very vigorous vine in fertile soil. The clusters are medium-small and long in shape with reddish-black to black berries.

This row features the **Ballerina** trellis system, a variant of the Scott Henry trellis in which half the shoots are trained upwards and half downwards. The lower shoots are left to fall naturally, rather than being forced down, providing protection from the sun in areas prone to sunburn.

### Row 8 - Cabernet Sauvignon

Originally from Bordeaux, this varietal has become world renowned for producing fine, long-lived red wine. Vine growth is very vigorous in an upright position. The clusters are small and long shaped and the berries are spherical and black in color. This row features the **Lyre** trellis system, which divides the canopy horizontally with shoots trained to grow vertically upwards, increasing sun exposure and allowing air movement around the fruit.

### Row 9 - Sauvignon Blanc

Sauvignon Blanc, also originating in Bordeaux, is a very aromatic varietal that makes some of the world's most popular dry wines. These vines are very vigorous and produce a heavy, dense canopy. The clusters are small, conical and compact with medium-large green berries. This row also features the **Lyre** system (see row 8 for description), helping to control the vigor and produce a balanced vine without excessive vegetation.

### Row 10 - Pinot Noir (clone 115)

This row of Pinot Noir (see row 6 for a description) is grown on the **Geneva Double Curtain** system. Originally developed at the New York State Agricultural Experiment Station in Geneva, this design requires the plant to grow two trunks and the cordons are trained

CONTINUED ON BACK



Ballerina trellis system  
(Row-End View)

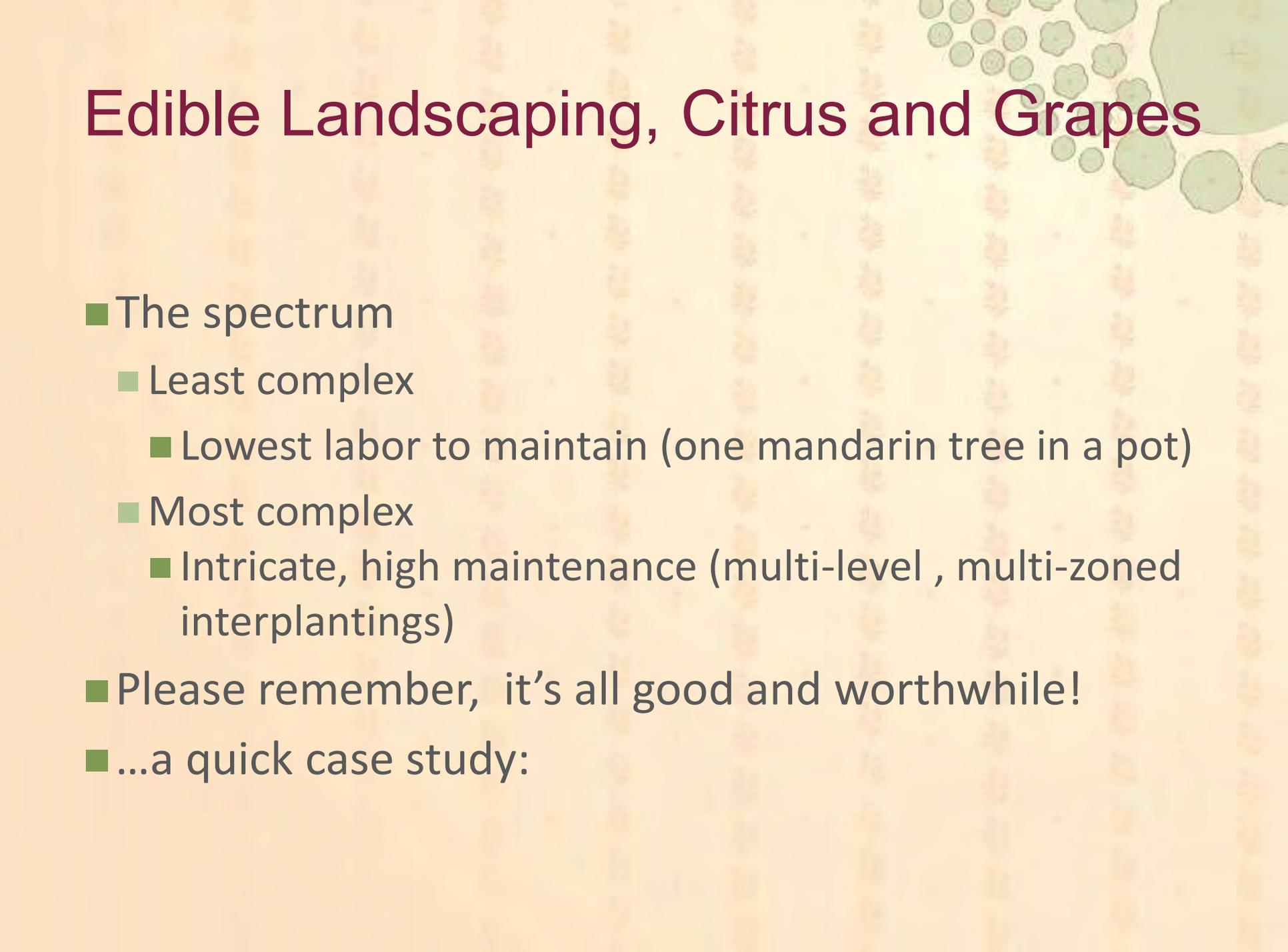


Lyre trellis system



Geneva Double Curtain  
trellis system

# Edible Landscaping, Citrus and Grapes

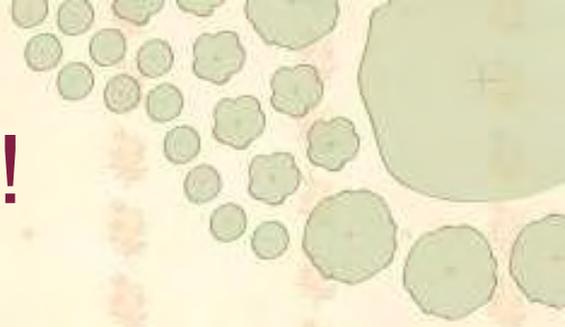


- The spectrum
  - Least complex
    - Lowest labor to maintain (one mandarin tree in a pot)
  - Most complex
    - Intricate, high maintenance (multi-level , multi-zoned interplantings)
- Please remember, it's all good and worthwhile!
- ...a quick case study:



# Edible Landscaping, Grapes!

- Questions and Discussion



The background of the slide is a light green color with a pattern of stylized green foliage and flowers. The foliage consists of various shapes, including circles, ovals, and irregular shapes, some with small crosses inside, representing leaves and flowers. The flowers are simple, five-petaled shapes. The overall style is clean and modern.

# Edible Landscaping

Vegetables, Herbs, and Edible Flowers

Gail Pothour  
Master Gardener  
UC Cooperative Extension



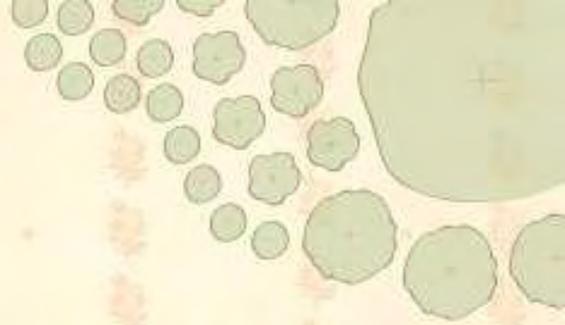




- Formal style: knot garden
  - Herbs as borders
  - Lettuce and other vegetables
  - High maintenance







# + Food Can Be Grown in Any Garden

Interplant edibles with your ornamentals



© 2009 Rosalind Creasy



Best of both worlds: edible and ornamental

Inter-planting reduces pests

New textures, forms, colors

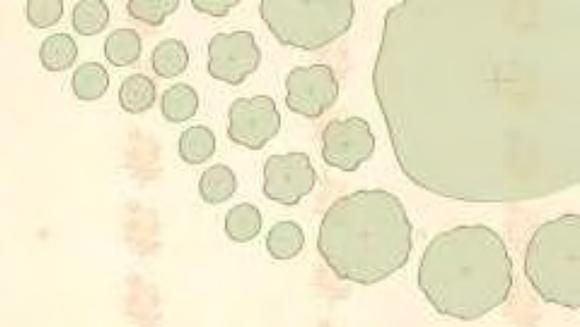
Grow what you like best

Fun for everyone

Great conversation piece

# Incorporating Vegetables into your Landscape...

- Make a list of edibles you like and that grow well in your climate
- Realize that some plants may not be compatible with certain areas or existing plants
- Identify the cultural needs of each
  - Sun vs. shade
  - Soil pH
  - Water requirements
  - Nutrient requirements
- Be aware of overall form
  - Size, shape, color, flowers, fruit
- Identify any pests/diseases that are common





# Choosing Varieties That Best Suit Your Needs

- Some plants have varieties/cultivars that are better suited in your landscape
  - Drought tolerance
  - Salt tolerance
  - Disease resistance
  - Pest resistance
  - Striking or more profound colors



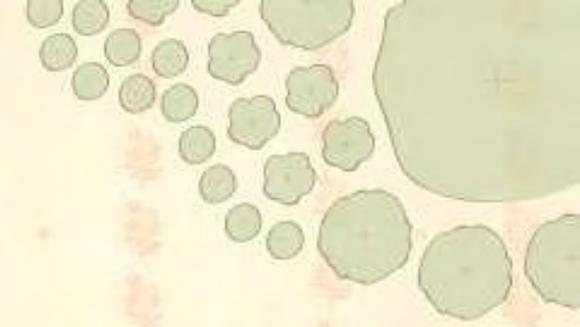
# Site Selection

- Vegetable crops perform best when well irrigated and receive at least 6 to 8 hours of sunlight
- Vegetables can be used as
  - Ground covers
  - Annual low border bedding plants
  - Visual screens
  - Trellis vines
  - Hanging baskets/containers



# Planting Your Edible Landscape

- Seasonal temperatures are very important
  - Warm season crops grow best when average daytime temperatures are between 65<sup>0</sup>-95<sup>0</sup>F
  - Cool season crops grow best when average daytime temperatures are between 55<sup>0</sup>-75<sup>0</sup>F



# Planting Your Edible Landscape

- Plants can be direct seeded, transplants, or self seeding
  - Use direct seeding for large seeded plants: corn, melons, squash, beans and peas; and for root crops: carrots, radish, beets, turnips, and parsnips
  - Use transplants for crops that you want to get an early start by growing them in the house, a cold frame or greenhouse
  - Sacramento Vegetable Planting Schedule (EHN 11)

# Food Can Be Grown in Any Garden

Interplant edibles with your ornamentals

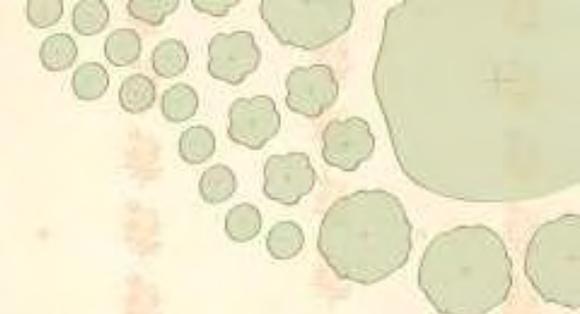


# Edible Herbaceous (Non-Woody) Borders

Alpine strawberry  
Angelica  
Anise hyssop  
Artichoke  
Arugula (perennial)  
Asparagus  
Basil  
Beet  
Borage  
Broccoli  
Cabbage  
Cantaloupe  
Celery  
Chard  
Chives  
Collards  
Corn

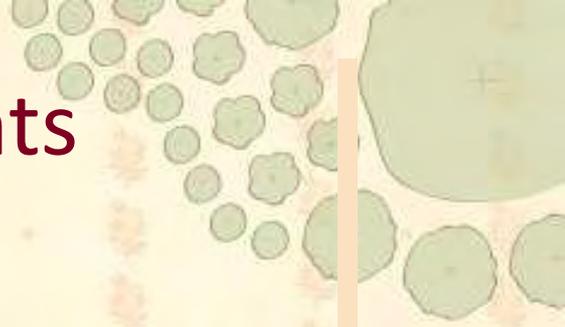
Cucumber (bush or trellis)  
Edible flowers  
Eggplant  
Endive  
Kale  
Lavender  
Lemongrass  
Lettuce  
Lovage  
Marjoram  
Mitsuba  
Mizuna  
Nasturtium  
Okra  
Orach  
Oregano

Parsley  
Pea  
Peanut  
Pepper  
Poppy (breadseed)  
Rhubarb  
Rosemary  
Safflower  
Sage  
Scented geranium  
Sea kale  
Shallot  
Squash (summer)  
Tarragon  
Tomato (determinate)

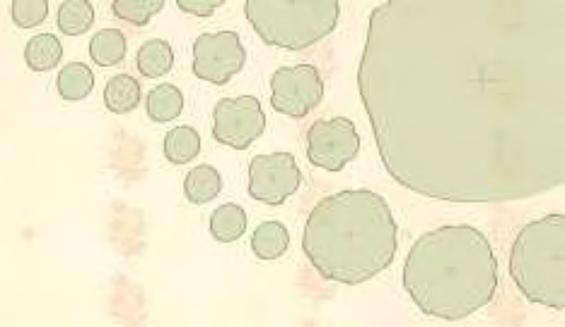


# + Many Edibles are Attractive Plants

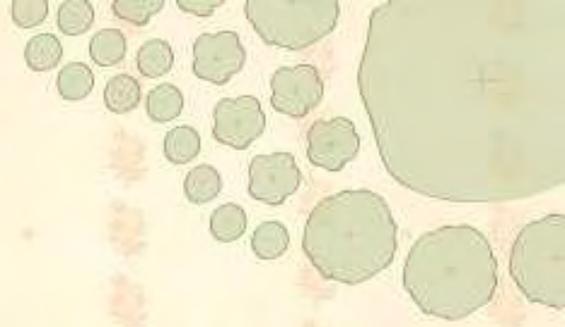
- Artichoke
- Kale
- Lettuce
- Mustard
- Rhubarb
- Broccoli and cauliflower
- Beets and chard
- Jerusalem artichoke
- Peppers
- Beans and peas
- Eggplant
- Tomatoes



# Artichoke



# Kale



# Lettuce



# Mustard



Photo by Nancy J. Ondra

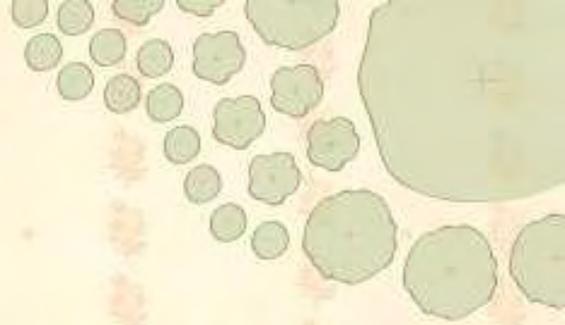


# Rhubarb



Photo: Rosalind Creasy

# Broccoli and Cauliflower



# Beets



# Beets



# Chard

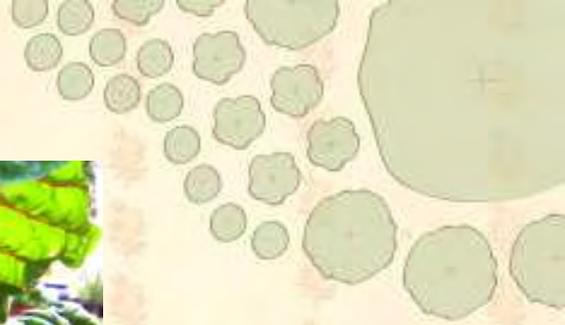
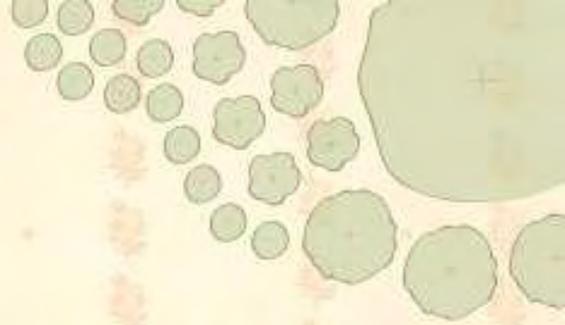




Photo: Renee Studebaker

# Jerusalem Artichoke



# Peppers





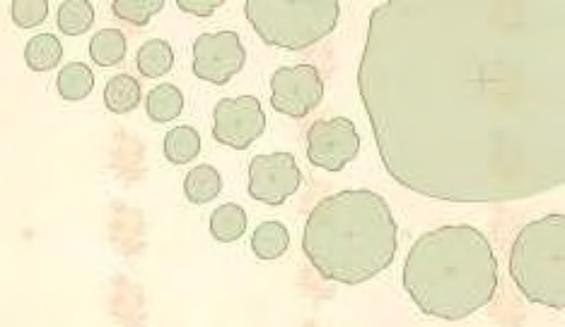
# Beans



# Beans



# Peas

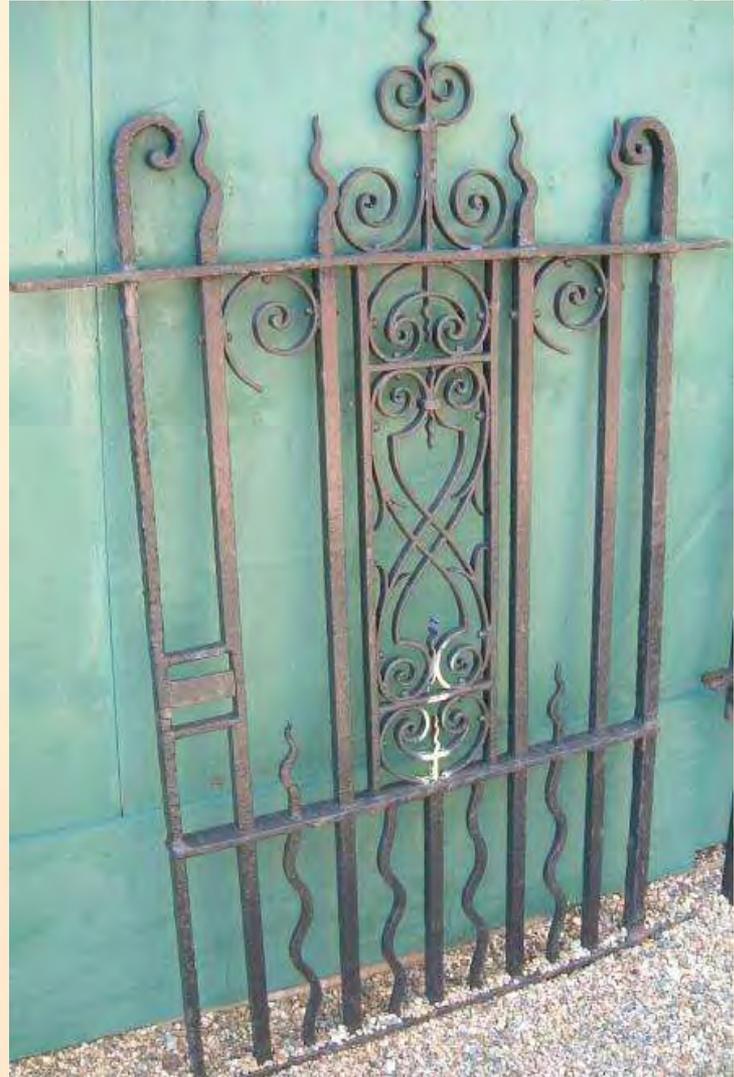


# Eggplant



# Tomato







Tomatoes being trained up garden obelisk  
Photo from <http://chiotsrun.com/2011/03/09/structural-elements-arbors-and-trellises/>



Peas trained on Backyardcreations Garden Obelisk  
Photo by Backyardcreationsforyu.com



# Edible Ground Covers

Alpine strawberry

Chamomile

Cucumber

Mint (creeping)

Peanut (temporary cover)

Rosemary (trailing)

Sweet potato (temporary)

Sweet woodruff

Thyme

Wintergreen



© Rosalind Creasy

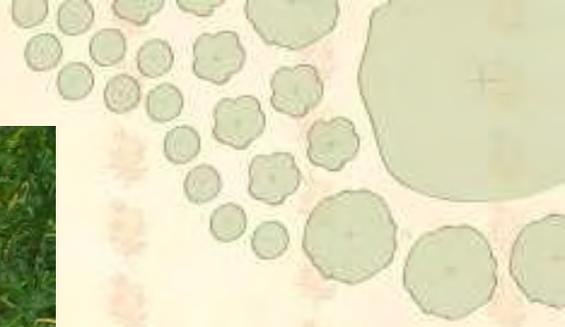
# Alpine Strawberry



# Chamomile



# Thyme



# Edible Herbaceous (Non-Woody) Borders

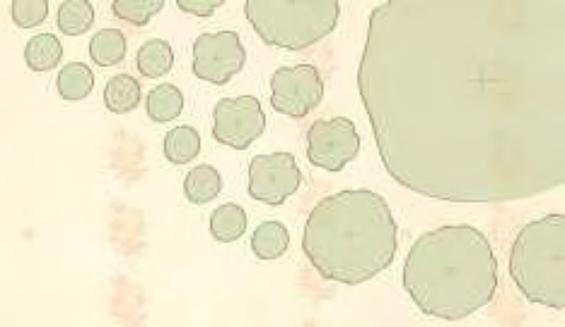


© Rosalind Creasy

# Basil



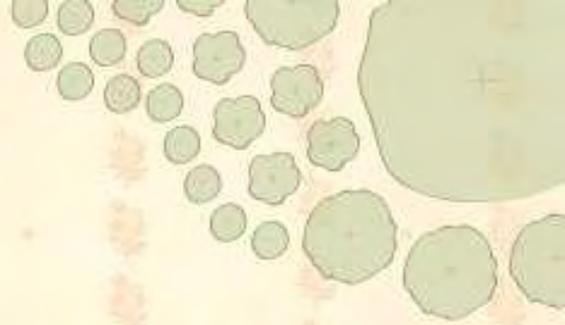
# Basil



# Lemongrass



# Rosemary



# Edible Flowers

Anise hyssop

Apple

Arugula

Basil

Bee Balm

Borage

Broccoli

Calendula

Chamomile

Chervil

Chicory

Chives

Chrysanthemum

Citrus

Daylily

Dianthus

Dill

Elderberry

Hibiscus

Hollyhock

Johnny-jump-up

Lavender

Lemon verbena

Lilac

Marigold

Mint

Nasturtium

Okra

Passion flower

Pineapple guava

Redbud

Rose

Rosemary

Sage

Scented geranium

Squash

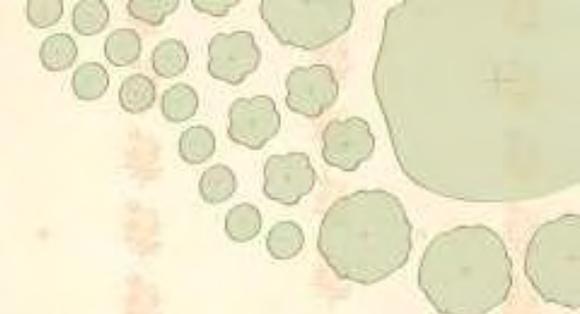
Sunflower

Sweet woodruff

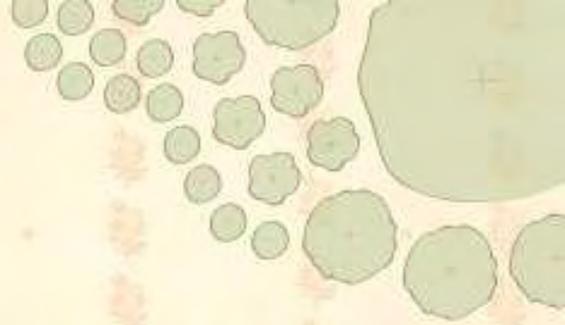
Thyme

Tulip

Violet

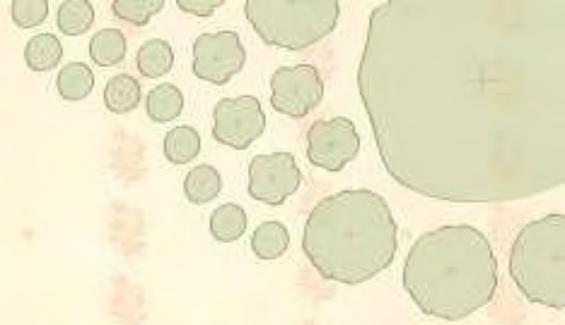


# Borage





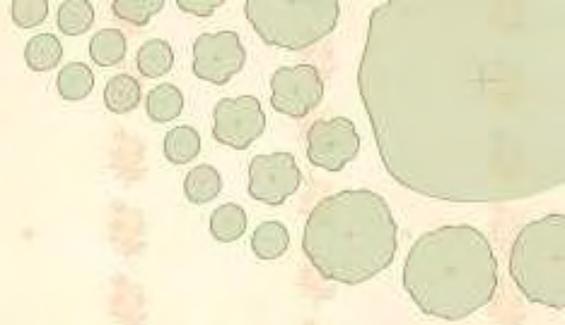
# Calendula



# Lavender



# Nasturtium



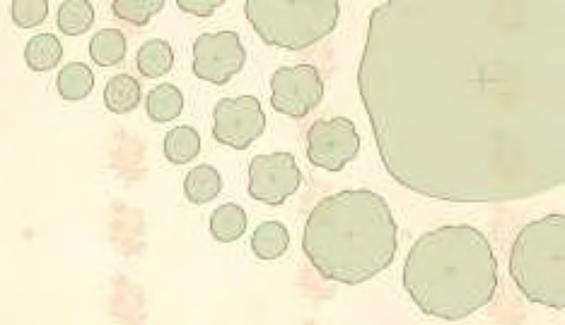
# Squash Blossoms



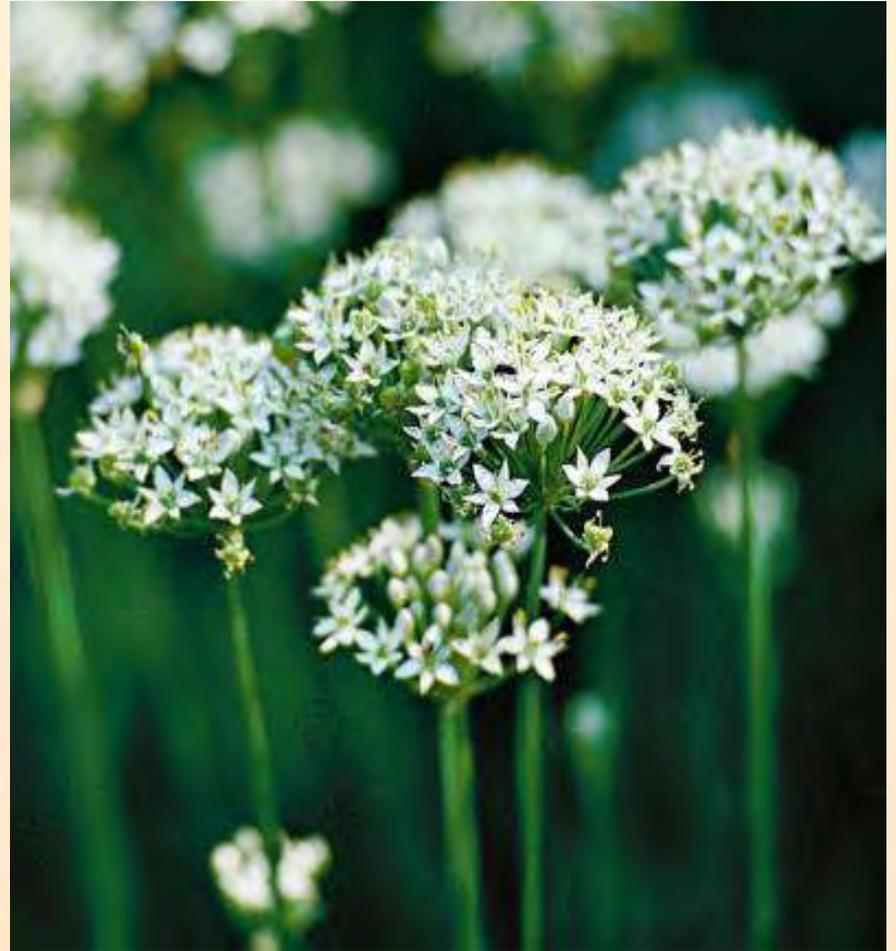
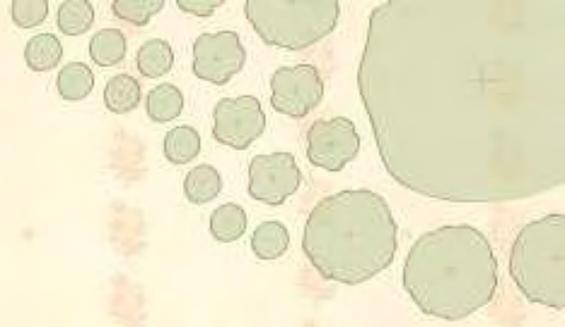
# Viola, Pansy, Johnny-jump-up, Violet



# Daylily



# Chives





# Corn in the front yard?







# Squash



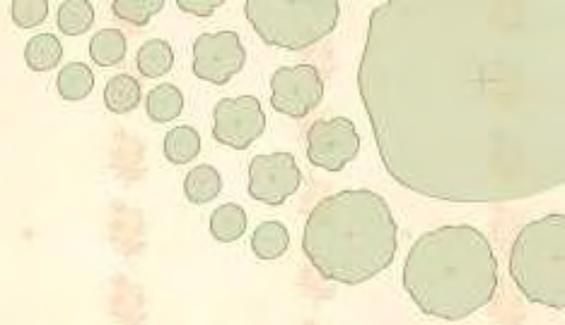
Photo: Rosalind Creasy



Photo: Rosalind Creasy





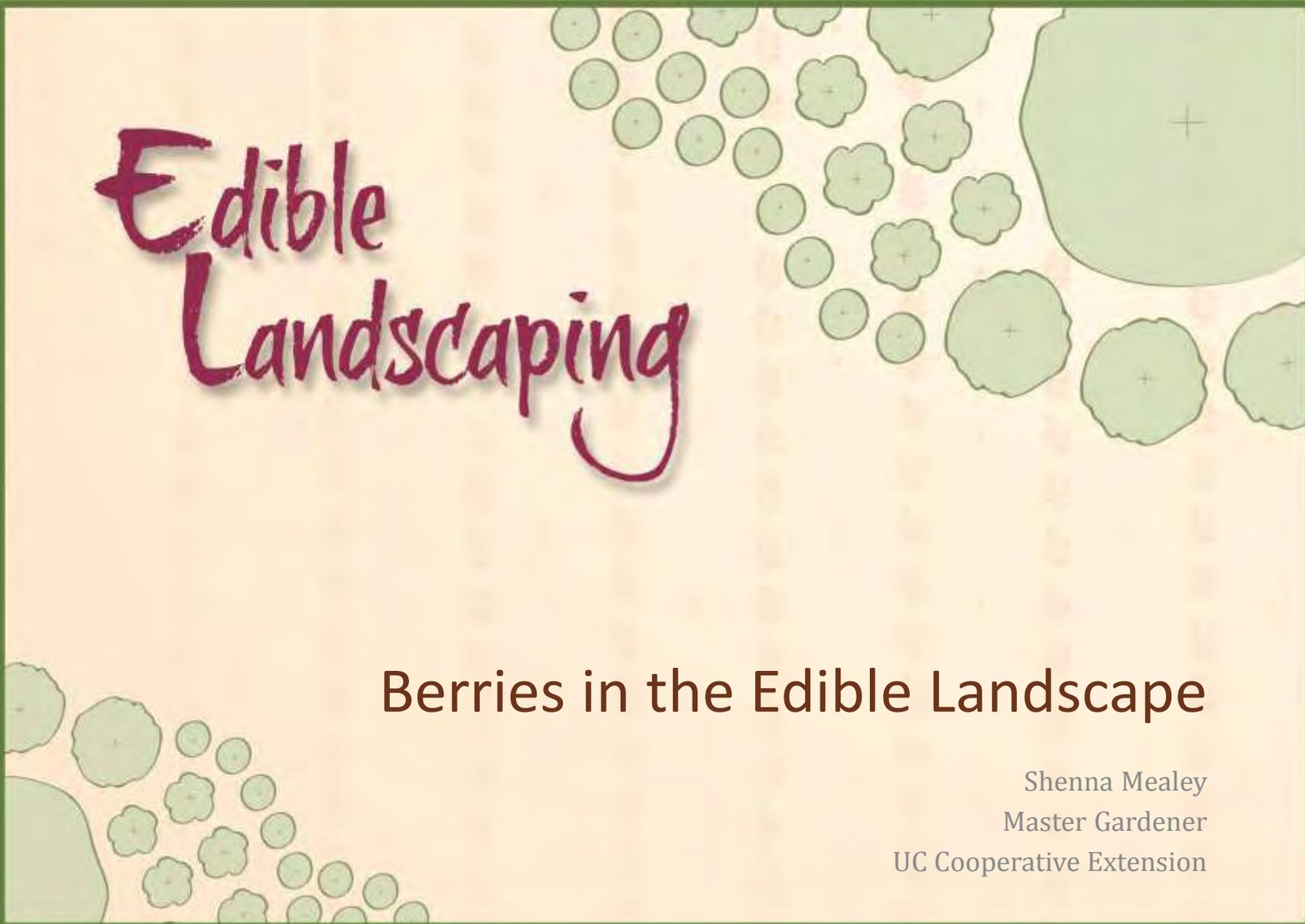




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# Questions





# Edible Landscaping

## Berries in the Edible Landscape

Shenna Mealey  
Master Gardener  
UC Cooperative Extension

# Blueberries, Blackberries and Raspberries



Blueberries



Boysenberries



Raspberries

# Blueberries



Blueberries are an excellent low-maintenance crop that fit well into the Edible Landscape.

# Blueberry Pollination

Blueberries are self-pollinating but fruit production will improve and berries will be larger if another variety is also planted.



# Blueberries in Containers

- Excellent choice for containers
- Adequate watering is critical
- Soil level eventually goes down due to high organic matter
- Dwarf varieties available



# Blueberry Plantings

Blueberries will grow in most soil types – provided that the soil is porous and well drained.



# Soil Sulfur Needed to Achieve pH 4.5 for Blueberries (tsp./cu. ft. of soil mix)

pH	Sand	Loam	Clay
5.0	0.5	1.5	2.3
5.5	1.0	3.0	4.5
6.0	1.4	4.3	6.5
6.5	1.8	5.6	8.4
7.0	2.5	7.5	11.3

# Blueberry Blossoms



Blueberries have beautiful pinkish-white clusters of flowers in the early spring.



# Harvesting Blueberries

Depending on location and variety, harvest can be in May, June or even July



# Caneberries – Blackberries, Boysenberries and Raspberries

- Caneberries are usually planted in the dormant season as bare root plants



- Blackberries should be planted 3½ to 4 feet apart in rows 8 to 10 feet apart

- Raspberries should be planted 2½ to 3 feet apart in rows 8 to 10 feet apart



# Caneberries and Trellises

- Blackberries, boysenberries and raspberries benefit from a trellis on which to tie or wrap the canes
- Blackberries are usually grown on a 3-wire trellis, at 2-, 4- and 6-feet
- Both the posts and the wires must be strong



# New Canes in Early March

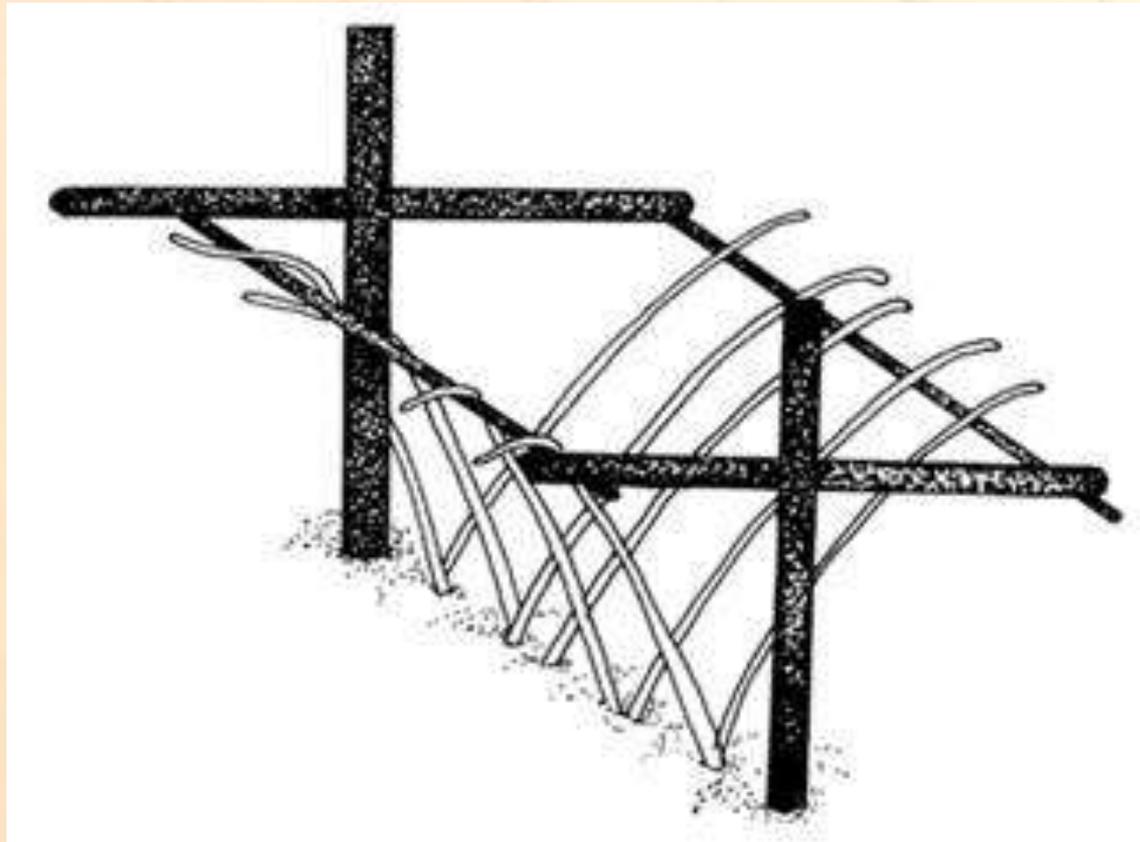


- After summer harvest, old blackberry canes that fruited are cut back to the ground
- About five to eight new canes are allowed to grow and all other new canes are also cut back to the ground.
- In the winter, the new canes are cut back to 5 to 6 feet long. The side branches (laterals) are cut back to 12" inches

# Raspberries



# Typical Raspberry Trellis



# New Raspberry Beds at the Fair Oaks Horticulture Center



Cutting 30-inch wide bamboo barrier in half; 15-inch used for beds



Connecting the ends



Planting a bareroot raspberry after installing 6 inch high wooden frame to protect bamboo barrier



Four new beds with bamboo barrier; about 2 feet by 3 feet each

# Caneberries

This is NOT how they have to grow



To keep cane berries from getting out of control, they must be properly pruned and trained.

# Using Caneberries in the Landscape



Caneberries can form a dense screen

# Using Caneberries in the Landscape



Not such a great screen in the winter

# Strawberries

- Strawberries come in June-bearing and ever-bearing varieties
- Strawberries make nice groundcovers
  - Need upkeep to maintain productivity
  - Not suitable for walking on
- Alpine strawberries produce smaller fruit but can grow in part shade



# Bird Netting Over Blueberries



# Edible Landscaping

