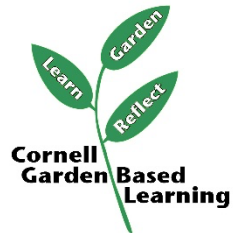




Cornell Cooperative Extension Cornell Garden-Based Learning

Fruit Gardening

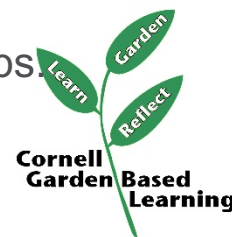
Growing Fruit in the Garden Landscape



Learning Objectives

We will...

- Describe the critical components of a suitable site for growing fruit and planning for minimizing pests.
- Identify keys to success in a garden setting for:
 - Trees (apples, pears, peaches, cherry, plum)
 - Woody vines (grapes & kiwi)
 - Bushes/shrubs (elderberries, currants, gooseberries, blueberries)
 - Herbaceous perennials (raspberries & blackberries)
 - Ground cover (strawberries)
 - Become familiar with pruning strategies for fruit crops.

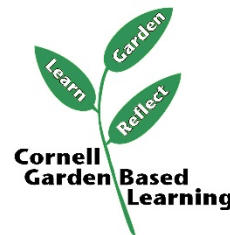


Discuss with a partner:

Today's pre-work was to research a particular fruit crop of interest using the *Cornell Guide to Growing Fruit at Home*.

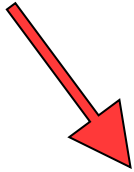
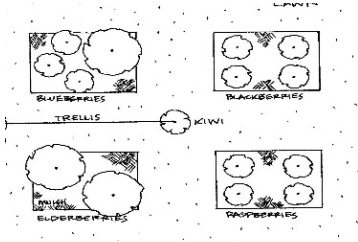
Pair up with a partner who chose the same fruit crop as you and discuss your findings.

- What are some keys to success and best management practices?
- What about site selection and pest prevention?



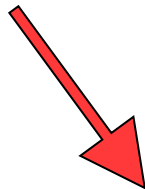
The most important years are the years *before* planting.

Plan

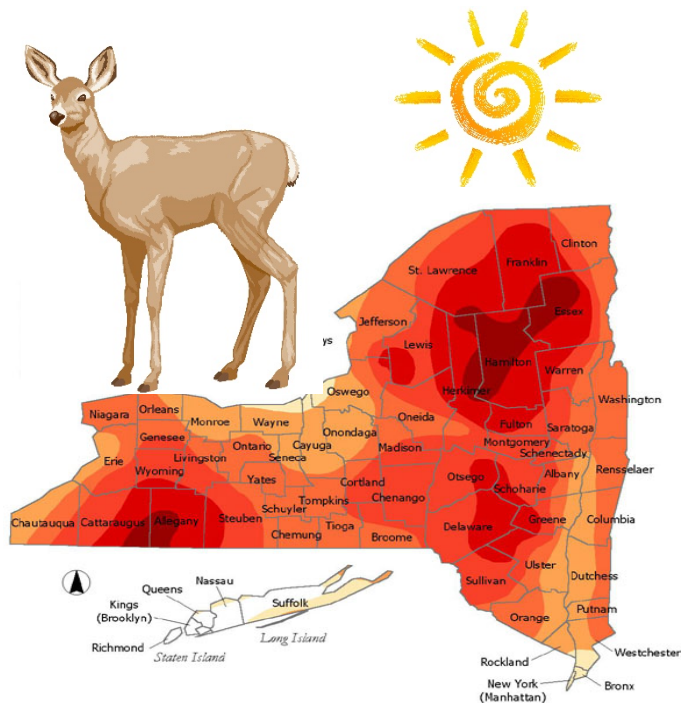
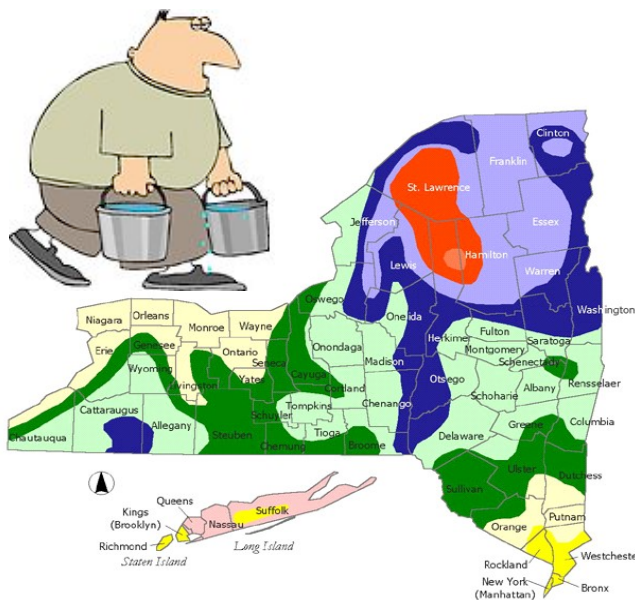


Prepare

Produce



Key to Success: Consider your Site



Why won't my plant set fruit?

Has it produced fruit in the past?

- If no: How old is the plant?
- If yes: Did it produce flowers?
 - If no: what were the low winter temperatures?
 - If yes: Was there a late spring frost?

Was there cold or rainy weather during bloom?

What crop? (self-fruitful?)

- How is the plant cared for? Nutrition and management?
- Are there any noticeable disease or pest issues?
- Is the site too shady?

Key to Success: Start Small

(A little can go a Long Way)

Fruit/rootstock	Spacing (ft)		Bearing age (years)	Potential yield at maturity (lb./plant)	Harvest period
	within rows	between rows			
Strawberry	2	4	2	1–2	June to early July
Raspberry	2	8	2	2–5	July or Sept
Gooseberry	4	10	2–4	6–8	July to Aug
Blueberry	4.5	10	3–6	3–10	late July to Sept
Blackberry	2	10	2	2–3	late July to Aug
Grapes-American type	8	9	3	20	early Sept. to Oct.
Apple/M.9	7	13	3-5	60	late July through Oct
Apple/MM.106	18	24	5	300	late July through Oct



Key to success: Promote Soil Health Before Planting



Growing Trees

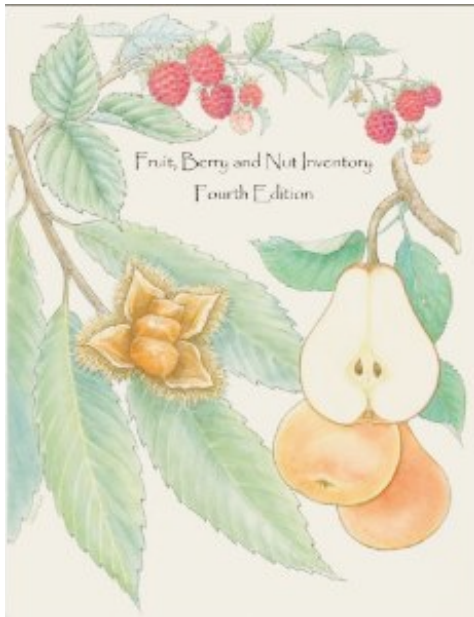
(apples, pears, peaches, cherry, plum)



Choosing Cultivars

(Cultivated Varieties)

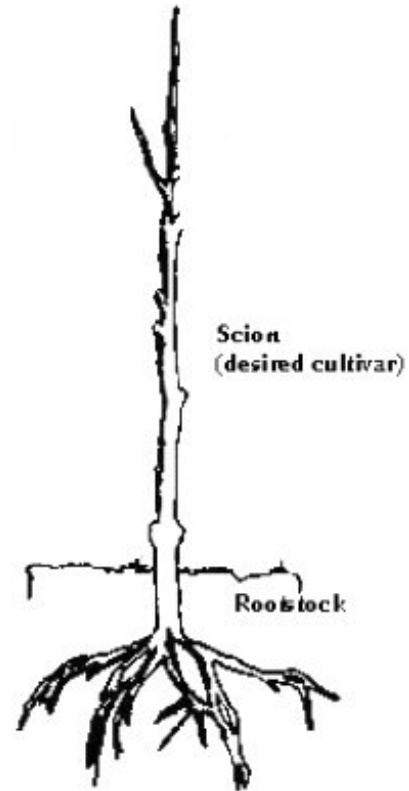
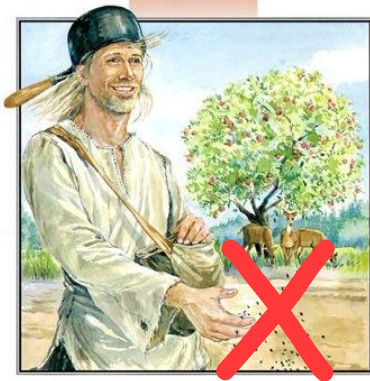
Right plant right place.



Sansa Apple

Consider cross pollination needs.

Apple Rootstock



How big?

Mature tree size depends on:

- vigor of the rootstock
- scion (cultivar grafted on rootstock)
- characteristics of the soil
- cultural practices



M.9
8 feet



M.26



M.7



MM.106



MM.111
24 feet

Rootstock for Other Tree Fruit

Pears

Old Home x Farmingdale

Plums & Prunes

St. Julian A

Myrobalan

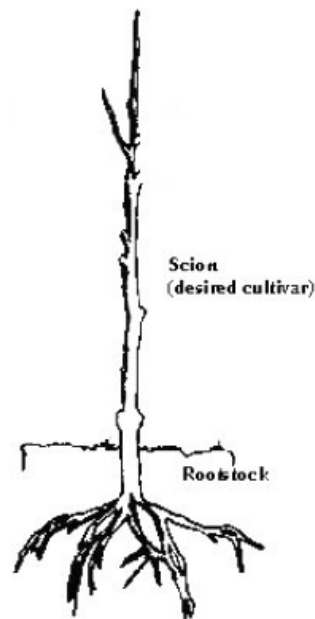
Peaches

Lovell

Cherries

Mahaleb

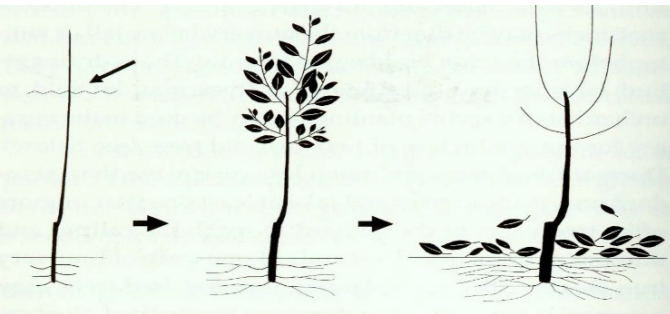
Mazzard



Pruning and Training

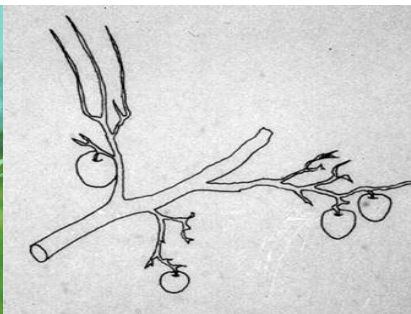
Start Early

fruiting wood and horizontal branches



Encourage

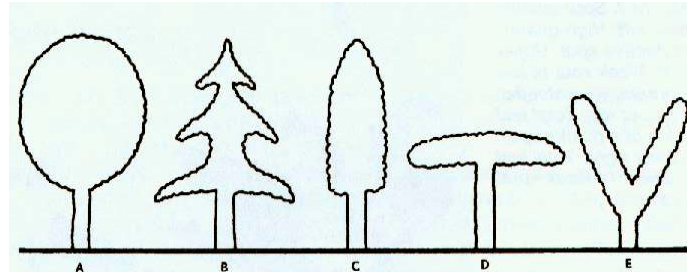
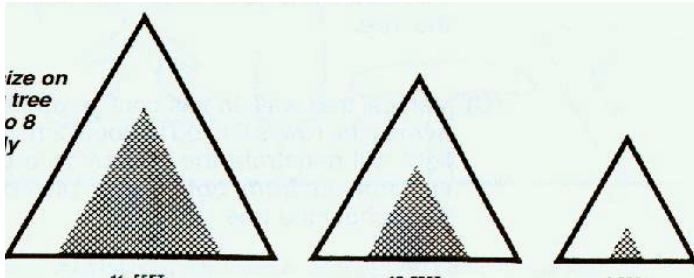
fruiting wood and horizontal branches



Pruning and Training

Maximize Light Interception

Maximize Light Interception



Pruning

Sharpen tools!



Tree Fruit Worksheet

Tree Fruit Planting Year			
Fall	Winter	Spring	Summer
Order 1-2-year-old plant stock		Plant & trim	Mulch
		Apply starter solution	Train

Tree Fruit Years After Planting			
Fall	Winter	Spring	Summer
Tie/stake	Prune and train in February-March	Consider fertilizing in April	Mulch
		Prune Peaches	Pinch & Train Thin fruit in June

Insect and disease management throughout.

More Edible Fruit Trees...

- Amelanchier (juneberry, serviceberry, shadbush...)
- Dogwood trees (Cornelian cherry...)
- Mulberry
- Pawpaw
- Beach plums
- Buffaloberry
- Quince
- Persimmons

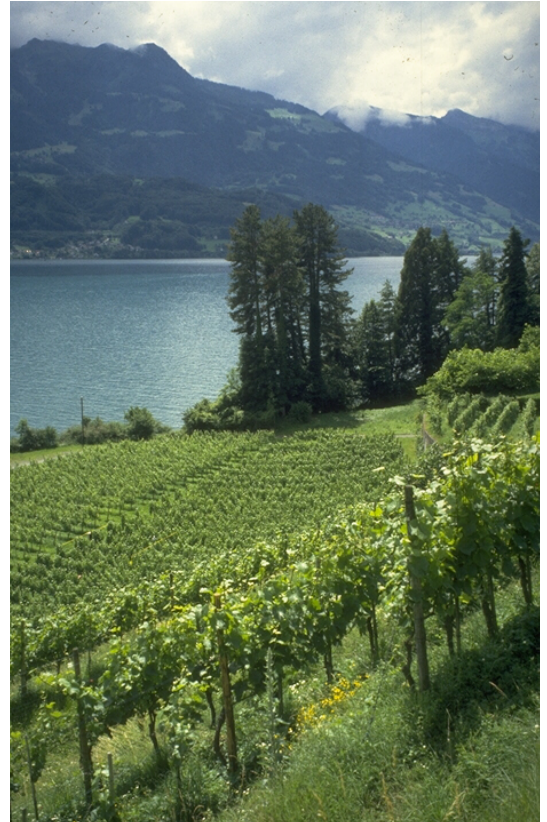
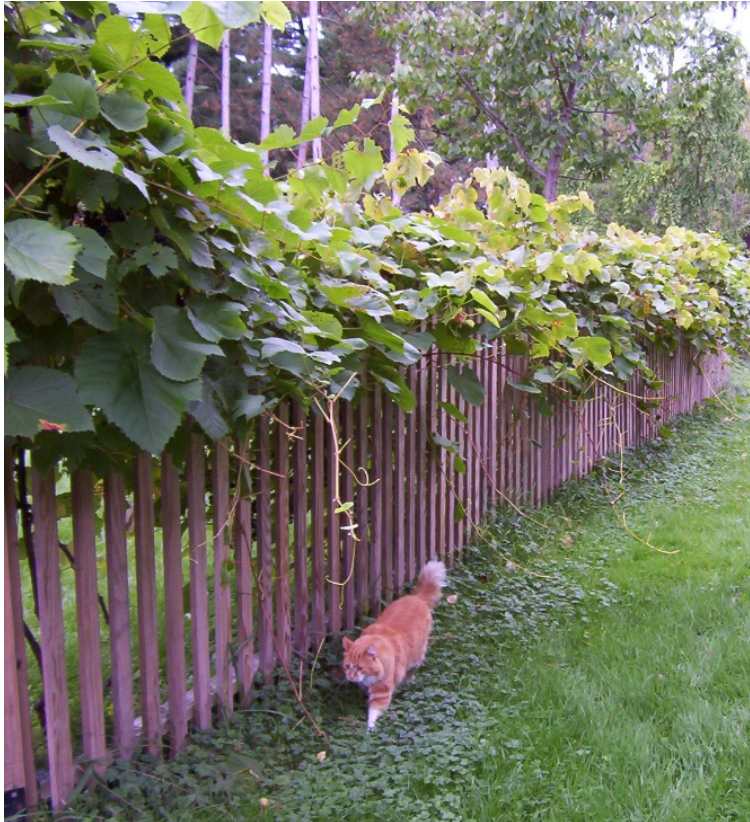
References:

- North American Fruit Explorers
<http://www.nafex.org/>
- CGGFH pg. 95



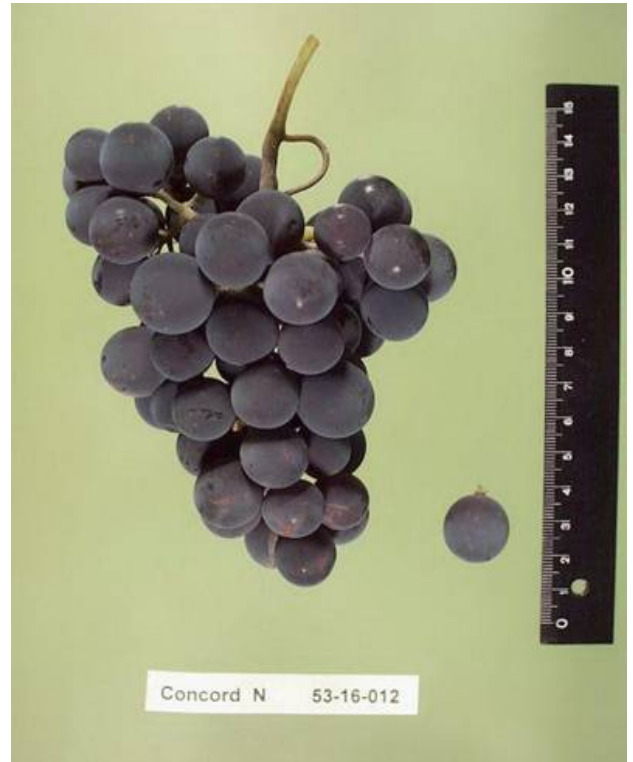
Growing Vines

(grapes, hardy kiwi)



Grape Types

- *Vitis labrusca* (Fox grape)
- French-American hybrids
- *Vitis vinifera* (traditional European species)
- *Vitis rotundifolia* (Muscadine)



Relative Disease Susceptibility

	Black rot	Downy mildew	Powdery mildew	<i>Botrytis</i>
Catawba	+++	+++	++	+
Concord	+++	+	++	+
Delaware	++	+++	++	+
Niagara	+++	+++	++	+
Aurora	+++	++	+++	+++
Cayuga	+	++	+	+
Chancellor	+	+++	+++	+
Foch	++	+	++	+
Seyval	++	++	+++	+++
Chardonnay	+++	+++	+++	+++
Riesling	+++	+++	+++	+++

The more + = more susceptible

Reference: CGGFH pg 43

Fungal Diseases

Black Rot



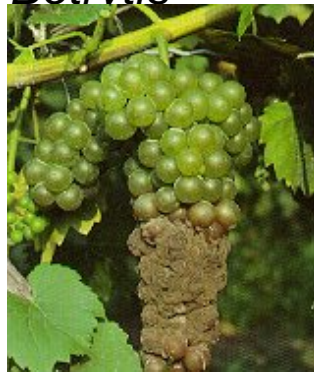
Powdery Mildew



Downy Mildew



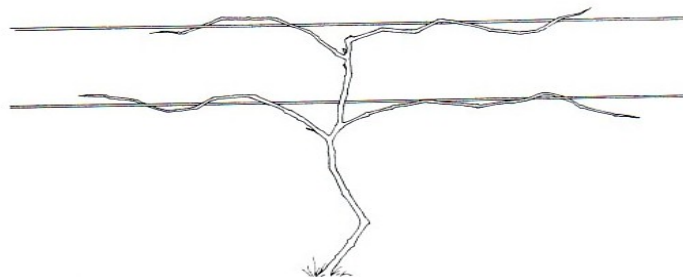
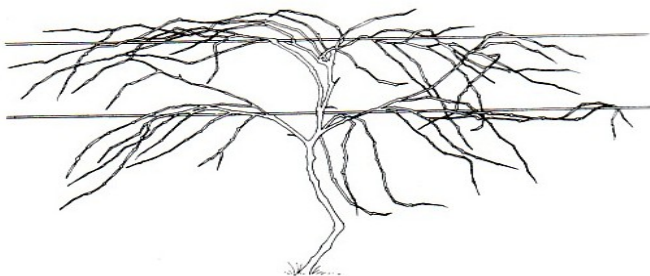
Botrytis



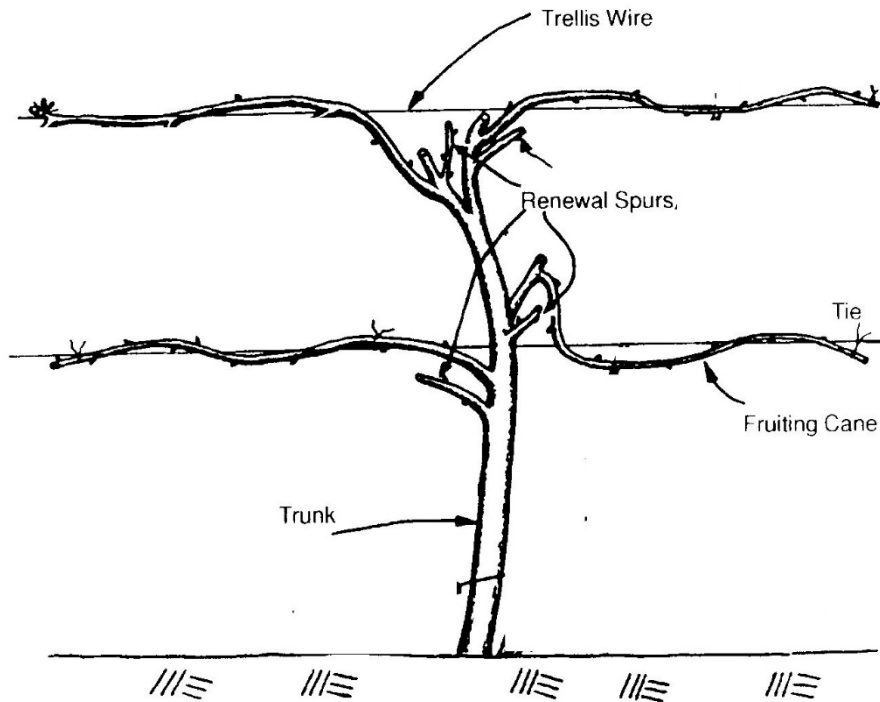
Reference:
CGGFH pg. 49

Pruning and Training

- ☑ Don't let vines become overgrown.
- ☑ Removal up to 90% of the new growth.
- ☑ Buds on one-year-old wood bear fruit.



Four-arm Kniffin System



Put These Actions in your Grape Worksheet

Grape Planting Year				
Fall	Winter	Spring		Summer
Prepare soil and install trellis	Purchase or propagate grapevine	Early	Late	Let grow Tie/stake Mulch
		Plant grape vines and remove to one cane	When new shoots are one inch or less, remove all but the strongest shoots	

Insect and disease management throughout.

Put These Actions in your Grape Worksheet

Grape Years After Planting			
Fall	Winter	Spring	Summer
Harvest Protect tender cultivars	Prune in February-March	Fertilize in April	Remove any flower clusters the first 2 years and possibly 3 years, depending on cane growth

Insect and disease management throughout.

Hardy Kiwi: Keys to Success



Oregon State
University Extension

PNW 017 - September/April 2003



Growing
Kiwifruit



Fruit Production Guide

Reference: CGGFH pg. 92

Growing Bushes/Canes

(elderberries, ribes, blueberries, raspberries and blackberries)



Elderberries



Ribes

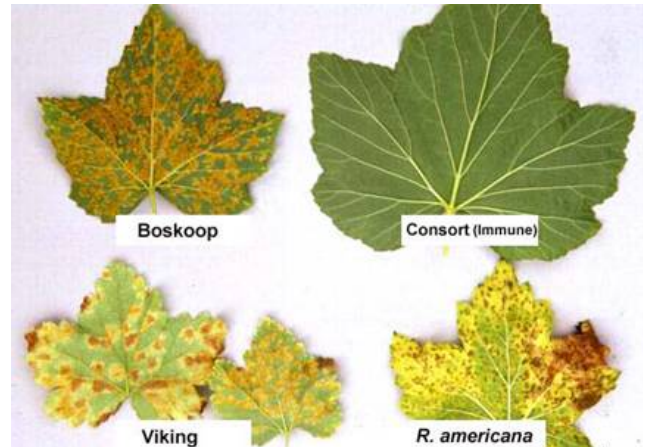
(currants, gooseberries)



Choosing Cultivars

Fungal Disease – White Pine Blister Rust

- Avoid susceptible **black** currants.



Choosing the Place

- Good air circulation
- Cool, moist, partial shade OK
- Prefer rich soil
- Heavy nitrogen feeders



Pruning

- ☑ Always remove diseased and broken shoots
- ☑ **Year 1** keep 6 to 8 vigorous shoots
- ☑ **Year 2** keep 4 to 5 one year old, and 3 to 4 two year old shoots
- ☑ **Year 3** keep 3 to 4 shoots in each age class
- ☑ **Year 4** remove oldest shoots and do as in **Year 3** with others



Ribes Worksheet

Ribes (currants and gooseberries) Planting Year			
Early Fall	Fall	Early Spring	Summer
Purchase plants	Add manure to planting hole Mulch		Weed Remove flowers

Ribes Years After Planting			
Early Fall	Fall	Early Spring	Summer
	Replenish mulch in fall or early spring	Prune and trellis Fertilize Replenish mulch in fall and early spring Adequate water	Weed Harvest Adequate water

Insect and disease management throughout.

Blueberries

lowbush blueberry

Vaccinium angustifolium

rabiteye blueberry

Vaccinium ashei

half-high blueberry



high-bush blueberry

Vaccinium corymbosum

northern

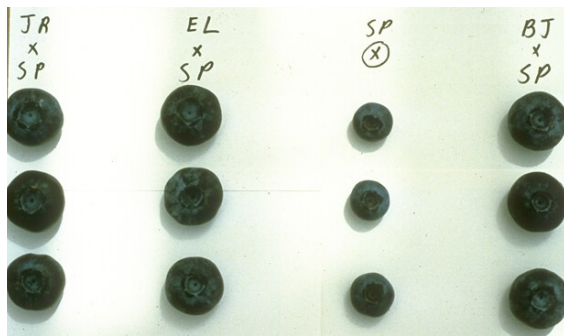
southern

Choose Cultivars

Right plant, right place.



Consider cross pollination benefits.



Pruning

- ✓ Prune in early spring
- ✓ Do not “hedge” prune. Remove from point of origin
- ✓ Always remove diseased and broken
- ✓ Remove old, large canes > 1 inch diameter
- ✓ Keep about 2 new canes per year up to 8 years
- ✓ Remove up to 20% of neglected bushes



Fungal Diseases

Fusicoccum canker



Phomopsis canker



*Some twig redness is normal cane aging.

Blueberry Worksheet

Blueberries Planting Year			
Winter	Early Spring	Summer	Fall
Purchase 2-3 year old plants	Plant	Remove flowers	Weed
	Prune to balance shoot to root	Weed	Mulch
	Weed	Mulch	Adequate Water
	Mulch	Adequate Water	Insect and disease management
	Adequate Water	Insect and disease management	
	Insect and disease management		

Blueberry Worksheet

Blueberries Years After Planting			
Winter	Early Spring	Summer	Fall
	Prune	Harvest	Weed
	Fertilize	Weed	Mulch
	Weed	Mulch	Adequate Water
	Mulch	Adequate Water	Insect and disease management
	Adequate Water	Insect and disease management	
	Insect and disease management		

Brambles

Idaeobatus (**Raspberries**)

R. occidentalis
black



R. idaeus
red and yellow



R. neglectus
purple



Eubatus (**Blackberries**)

- erect
- semi-trailing
- trailing



Raspberry-Blackberry
hybrids (such as
Loganberry)

Fungal Diseases

Verticillium wilt



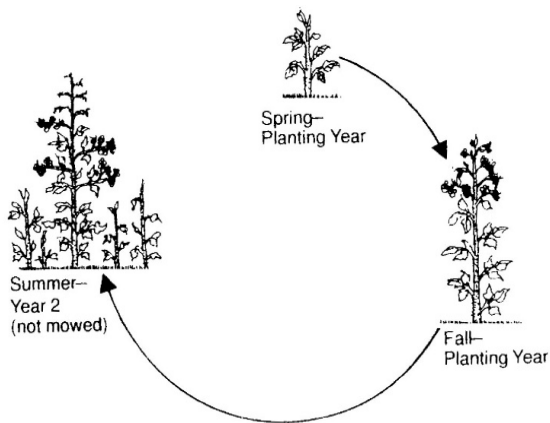
Phytophthora root rot



Raspberry Types

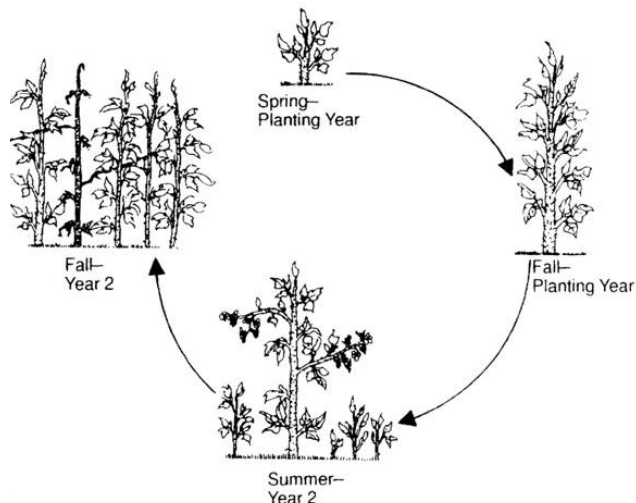
Primocane (fall) fruiting

- Fall or everbearing
- Red or yellow



Florican (summer) fruiting

- Summer bearing
- Red, yellow, black or purple

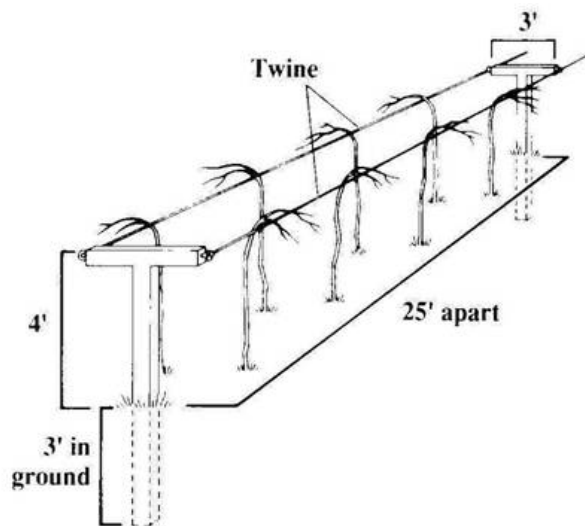


Primocane Fruiting Brambles Worksheet

Primocane (fall) Fruiting Brambles Planting Year and Beyond				
Winter	Spring		Summer	Fall
Purchase plants	Early	Late	Trellis	Harvest
	Plant	Fertilize	Weed	Cut to ground
			Mulch	
	Weed	Weed	Adequate water	Weed
	Mulch	Mulch		Mulch
	Adequate water	Adequate water		Adequate water

Insect and disease management throughout.

Trellising Primocane Fruiting Plants



- ✓ Keeps berries off ground
- ✓ Makes harvest easier

Floricanne Fruiting Brambles Worksheet

Floricanne (summer) Fruiting Brambles Planting Year				
Winter	Spring		Summer	Fall
Purchase plants	Early	Late	Tip black and purple	Trellis
	Plant	Fertilize		
	Weed	Weed		
	Adequate water, avoid prolonged wet leaves	Adequate water, avoid prolonged wet leaves		
			Adequate water, avoid prolonged wet leaves	Weed
				Adequate water, avoid prolonged wet leaves

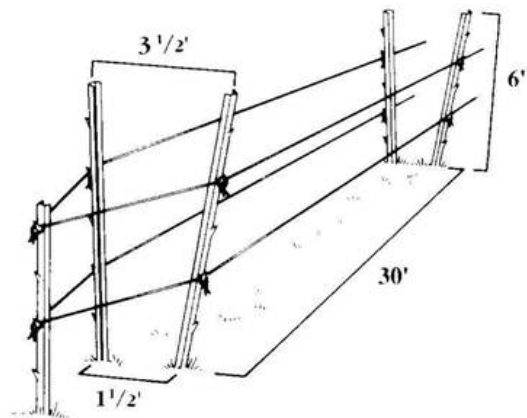
Insect and disease management throughout.

Floricanes Fruiting Brambles Worksheet

Floricanes Fruiting Brambles Years After Planting			
Winter	Early Spring	Summer	Fall
	Prune and trellis	Harvest	Tie canes to trellis
	Fertilize	Remove spent floricanes	Weed
	Weed	Weed	Mulch
	Mulch	Mulch	Adequate water
	Adequate water	Adequate water	

Insect and disease management throughout.

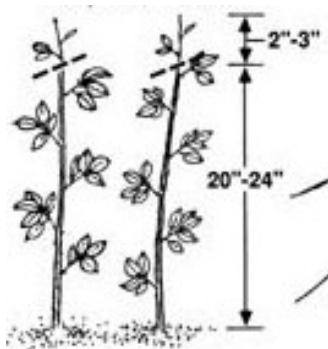
Trellising Floricane Fruiting Plants



- ☑ Reduces winter breakage.
- ☑ Keeps berries off ground.
- ☑ Makes harvest easier.
- ☑ Can reduce interference among canes.

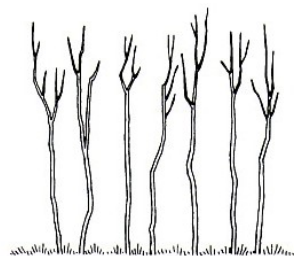


Pruning



Floricanes fruiting BLACK and PURPLE

2 to 3 canes per hill



Floricanes fruiting RED 3 to 4 canes per foot of row

More bushes & shrubs



- Aronia/Chokeberry
- Beach plums
- Rubus species

North American Fruit
Explorers www.nafex.org/

Growing Groundcover

(strawberries)

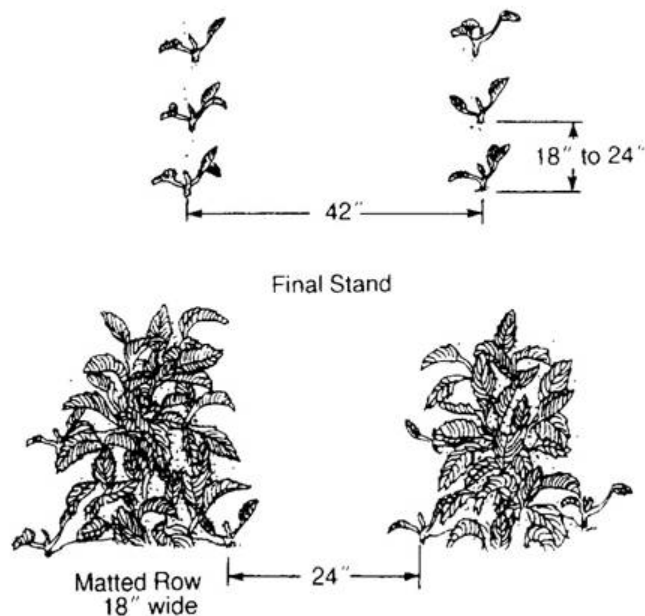
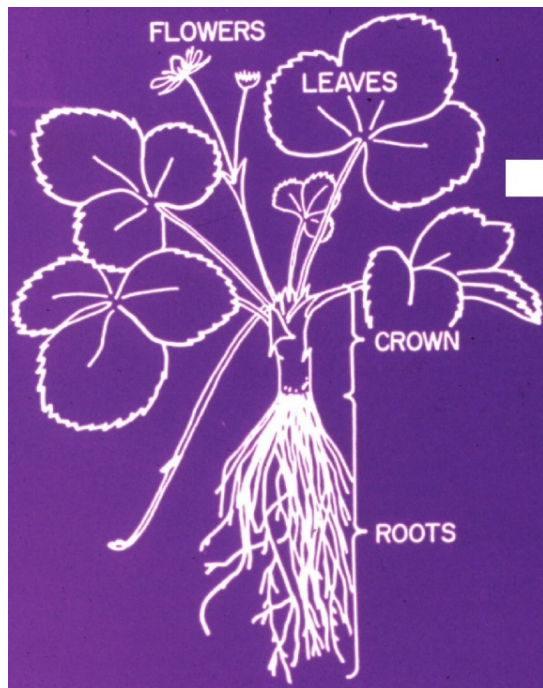


Fragaria x ananassa **Duch.**

- June-bearing
- Day-neutral
- Everbearing



Planting



Strawberry Worksheet

Strawberry Planting Year				
Winter	Early Spring		Summer	Fall
Purchase plants	Early	Late	Weed	Fertilize
	Plant	Fertilize	Remove flowers as desired	Straw mulch
	Weed	Weed	Adequate water	Weed
	Remove flowers as desired	Remove flowers as desired	Insect and disease management	Remove flowers as desired
	Adequate water	Water		Adequate water
	Insect and disease management	Insect and disease management		Insect and disease management

Strawberry Worksheet

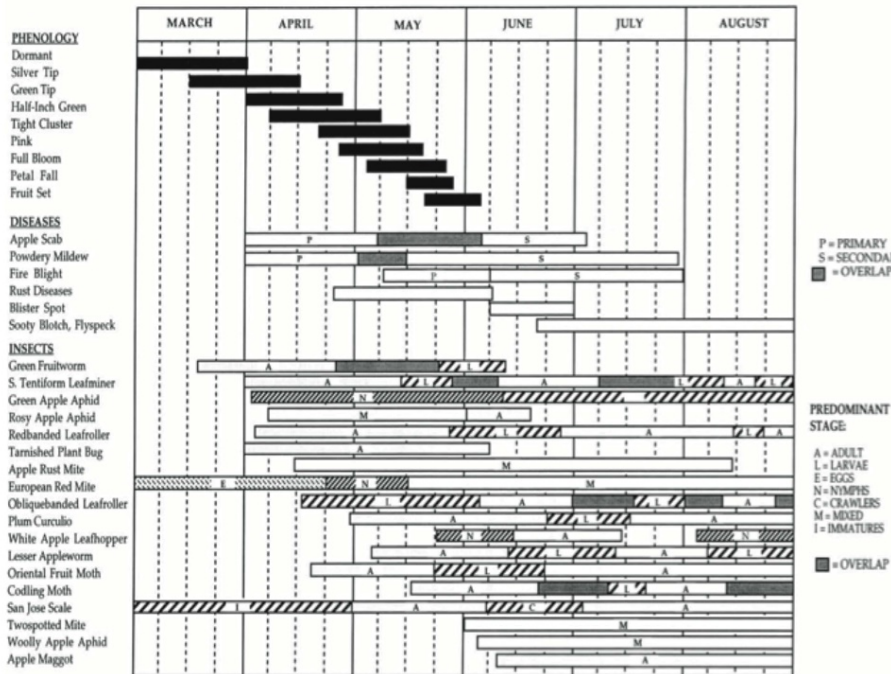
Strawberries Years After Planting			
Winter	Early Spring	Summer	Fall
	Remove mulch (Row cover until bloom) Frost protection Adequate water Insect and disease management	Harvest Renovation: Mow, weed, narrow rows, fertilize Adequate water Insect and disease management	Straw mulch Fertilize Insect and disease management

Ounce of Prevention

- Evaluate site conditions and options
- Plant resistant cultivars
- Start with healthy plants
- Supply adequate: space, water & nutrients
- Commit to proper pruning & training
- Cleaned up crop debris
- Provide habitat for beneficials
- Know pests' life cycles

Cornell Guidelines for Commercial Tree Fruit Production (CGCTFP)

FIGURE 9. CALENDAR OF EVENTS OF APPLE IN LAKE PLAINS AREA OF NEW YORK



TREE FRUIT FIELD GUIDE

to Insect, Mite, and Disease Pests and Natural Enemies of Eastern North America



Look inside for sample pages and sponsor, pre-order info

A. Agnello, G. Chouinard, A. Firlej, W. Turechek, F. Vanoothuyse and C. Vincent

Natural Resource, Agriculture, and Engineering Service Cooperative Extension

The Berry Diagnostic Tool

- a companion to the NRAES Production Guides for Strawberries, Raspberries and Blueberries

Assisting with the identification of diseases, insects, chemical injury and physiological disorders that affect berries

Developed by Dr. Marvin Pritts, Cornell University, Ithaca, NY 14853

Please select a crop:

To return to this page, click on any photo, then click on the return button



Raspberry Diagnostic Tool

Symptoms: (click on the most appropriate description, then click on any photo for further information or to exit)

Canes and/or laterals

[General decline in plant vigor](#)

[Canes, fruiting laterals or tips are wilting and collapsing](#)

Leaves and stems

[Leaves are unusually colored, spotted or necrotic](#)

[Leaves are curled, rolled or crinkled](#)

[Leaves are chewed or have holes in them](#)

Flowers and fruit

[Flower buds turn brown prior to opening](#)

[Fruits are small, deformed or crumbly](#)

[Fruits are rotting prior to harvest](#)

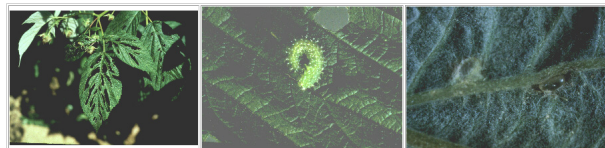
[Individual drupelets are white](#)

[Flowers, buds or fruits have some type of physical injury \(cut buds, holes, worms, etc.\)](#)

Adults also feed on buds, but the damage is minimal. Notice an egg on the bud above the adult.



Sawfly larvae can be very damaging to raspberry leaves. Notice the egg in the right photo.

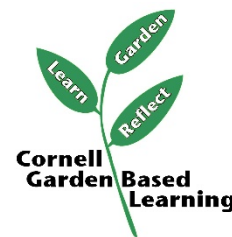


Leaf miners affect blackberries more than raspberries

Small Group Discussions

Get into small groups and discuss what you have just learned about fruit crops.

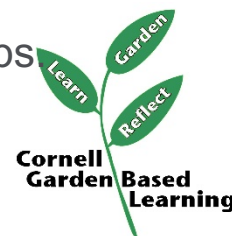
- What questions do you still have? Where might they be answered?
- What surprised you?
- Where will your next fruit growing experience be?
- How will you reach beyond your garden gate to share this knowledge with others?



Learning Objectives

Today we:

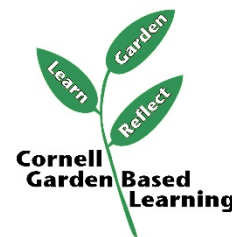
- Described the critical components of a suitable site for growing fruit and planning for minimizing pests.
- Identified keys to success in a garden setting for:
 - Trees (apples, pears, peaches, cherry, plum)
 - Woody vines (grapes & kiwi)
 - Bushes/shrubs (elderberries, currants, gooseberries, blueberries)
 - Herbaceous perennials (strawberries and caneberries such as raspberries & blackberries)
 - Became familiar with pruning strategies for fruit crops



References

References:

- *Cornell Guide to Growing Fruit at Home*
- *Growing Fruit in the Garden Landscape* presentation, created by Lori Brewer and revised by Laura McDermott (2013)



Learn More

Contact: Cornell Garden-Based Learning

<https://nysipm.cornell.edu/agriculture/fruits/cce-programs/statewide/>

Published: April 2019

Author: Lori Brewer, Senior Extension Associate

Revised: Laura McDermott, Regional Extension Specialist,
Eastern NY Commercial Horticulture Program

Reviewer: Fiona Doherty, Extension Support Specialist I,
Russell Welser, Senior Resource Educator,
Gregory Peck, Assistant Professor

