

Challenges & Opportunities in the Production & Marketing of Fruit & Nut Crops

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Fruit Crops Production

Negatives:

- High risk
- High inputs
 - Labor
 - Management
 - Capital
- Relatively little mechanization
- Several years before a return on investment
- Perishable crops

Positives

- Can be done on smaller acreages
- Can utilize hilly land
- Potentially high returns per acre
- High level of interest by consumers in locally produced crops

Getting Started in Fruit Production

- Lag time between planting & 1st crop
 - No return on investment
 - Determines productive potential of planting over its entire life
- Trees/vines/bushes live for many years
 - What you do this year affects what happens next year
- Fruit buds initiated in the growing season of the previous year
- Multiple pests
- Perishable commodity

What to Grow?

- **Market demand**
- **Site limitations**
 - Winter damage
 - Spring frosts
 - Pest pressures
 - Water:
 - Quantity
 - Quality
- **Species**
 - Cold hardiness
 - Chilling requirement
- **Varieties**
 - Bloom time
 - Pest resistance
- **Rootstocks**
 - Pest resistance
 - Size control
 - Precocity

What To Grow?

- **What is not being grown in your area?**
 - **Is this an opportunity?**
 - No competition
 - High returns
 - Or a **Red Flag?**
 - No market demand
 - Serious production limitations
 - Limited availability of equipment & supplies

What to plant?

Yes	Maybe	No
Apple	Peach	Apricot
Pear: European Asian	Nectarine Plum	Plumcot Pluot
Grape: American Hybrids	Tart Cherry Sweet Cherry	Aprium Fig
Blackberry Raspberry	Grape: <i>V. vinifera</i> muscadine	
Blueberry: Rabbiteye No. Highbush		
So. Highbush		

Harvest Periods

Crop	May	June	July	Aug	Sept	Oct	Nov
Strawberries	————				— — —		
Raspberries		————		————			
Blackberries		————		— — — —			
Stone Fruits		————					
Grapes			————				
Muscadines					————		
Pears				————			
Apple			————				
Pecans					————		

Tree Crop Timeline

		Planting to 1 st crop	Planting to full crop	Life expectancy
Apples (semi-dwarf)		3 to 4 years	6 to 8 years	20+ years
Apples (dwarf)		2 years	5 to 6 years	? (15 + years)
Stone fruits		3 years	5 to 6 years	17 -20 years

Who's the Boss? (Managerial Needs)



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- Fruit production is unique, intense & needs high levels of management
 - Who will be the manager?
 - You or an employee
 - How capable
 - How much time to devote
 - Interest level –
 - Just a job or a real passion
 - Is there a back up person in case the manager is unavailable

Labor

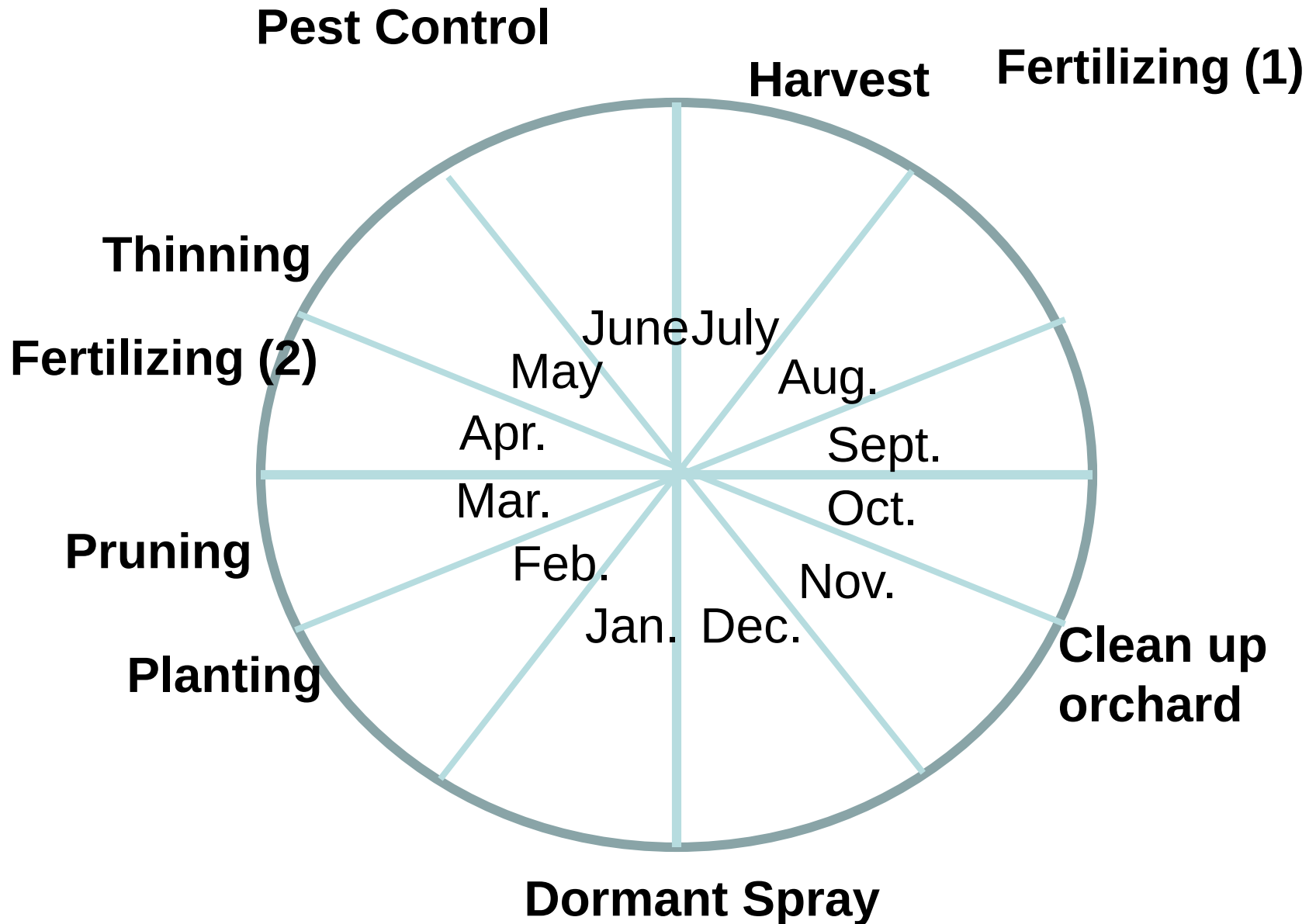


- How much is available?
 - Low level of mechanization
 - Relatively narrow time window on some operations
- How skilled are they?
 - Can be left to work without close supervision
- How consistent are they?
 - Will you be frequently training new employees or retraining existing ones?
- How conscientious are they?
 - Impact current & successive years crops

In It For The Long Haul: Plant ~ 3 to 5% Every Year

- Stable production year after year
 - Avoid having everything “over the hill” at the same time
- Ability to keep up with:
 - newest varieties
 - rootstocks
 - training systems
 - technologies

Calendar



Site Selection

- **Most important decision a grower can make**
- Every aspect of crop development and marketing will be influenced by the site

“Live Where You Farm” - - -

NOT

“Farm Where You Live”

David W. Lockwood

Plant Sciences

Univ. of TN/Univ. of GA

S.E. Apple Growers, 2007

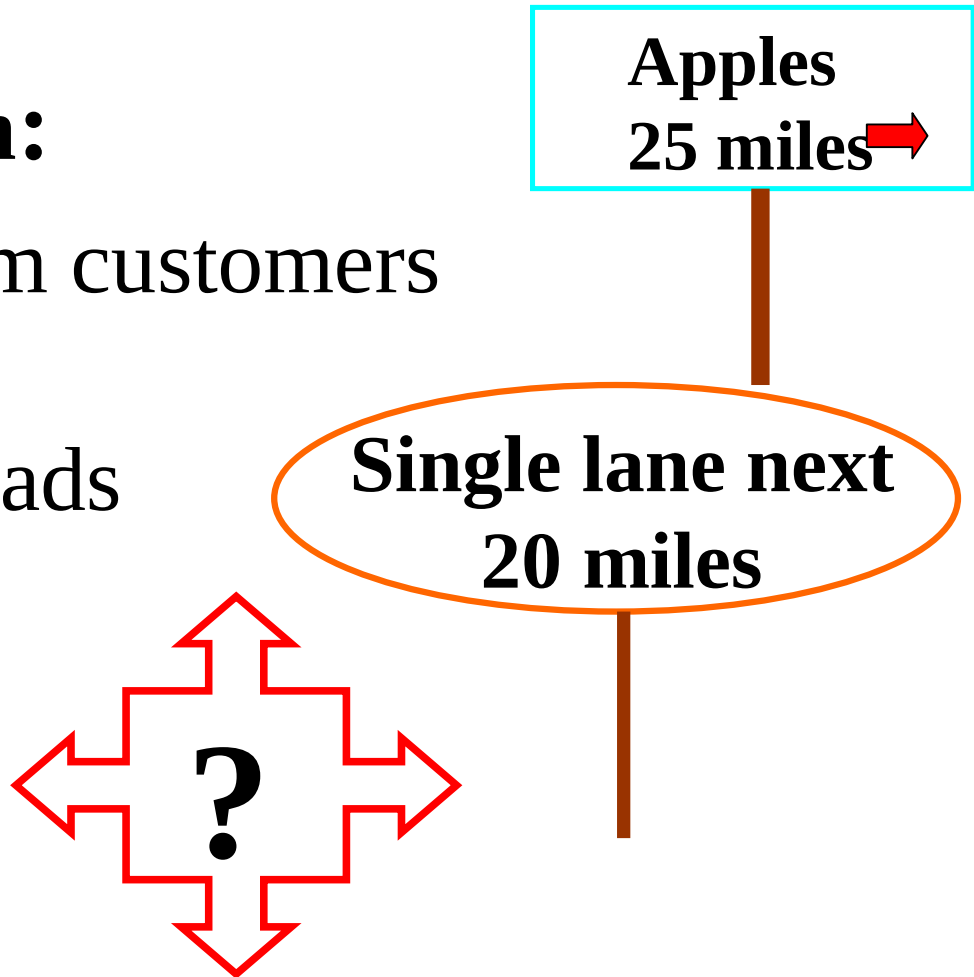
Orchard Site Score Sheet

- Accessibility
- Full sun
- Elevation
- Slope – aspect and steepness
- Soil Characteristics – drainage (internal & surface), potential rooting depth, fertility
- Water – quantity & quality
- Wildlife
- Adjacent agricultural operations

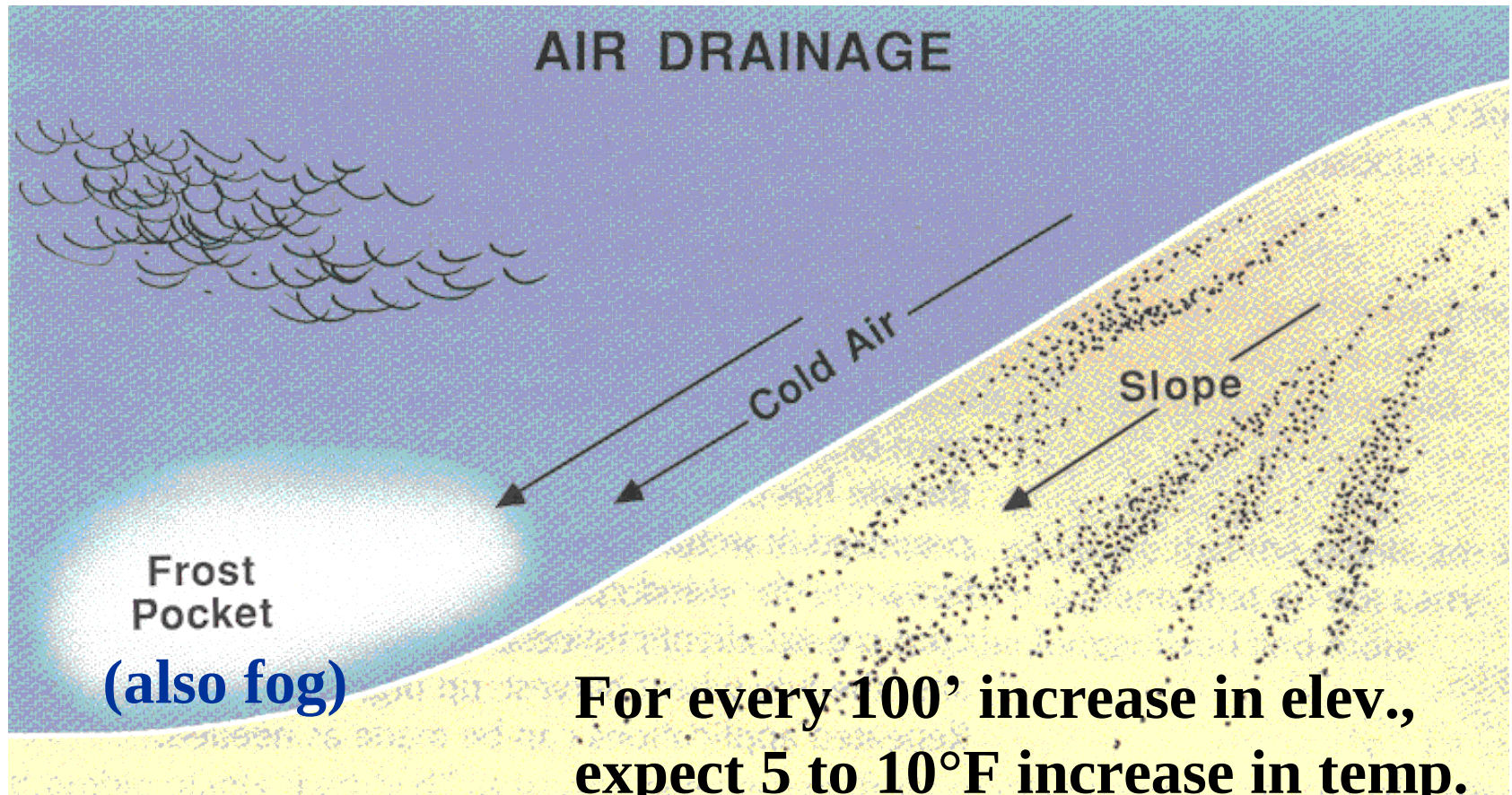
Market Considerations

- **Retail on farm:**

- Distance from customers
- Quality of roads
- Easy to find
- Parking



Elevation



**For every 100' increase in elev.,
expect 5 to 10°F increase in temp.
during a radiation frost event**



Components of a Desirable Site



- Full sun
- Elevation (frost & disease protection)
- Soils:
 - pH of 6.0 to 6.5 (4.8 to 5.2 for blueberry)
 - High organic matter content
 - Well-drained (internal & surface)
 - Min. of 30 – 36” rooting depth
 - Moderate fertility
- Available water supply



Wildlife Damage Control



Wildlife Damage to Selected Fruit Crops – 1998 Estimate

- Survey conducted by USDA, APHIS, Wildlife Services
- Included 8,850 producers in California, Michigan, New Jersey, New York, North Carolina, Pennsylvania & Washington
- \$41 million dollars loss reported





Site Preparation

- Soil testing
- Elimination of noxious weeds
- Remove barriers to good air drainage
- Address poor water drainage areas (if applicable)
- Remove wild/abandoned fruit near the planting site
- Establish desired orchard floor cover

Need for Cross Pollination?

- Strawberries No
- Blackberries No
- Raspberries No
- Grapes:

American bunch, French hybrids,

& V. vinifera No

Muscadine

Yes (female flowered varieties)

Blueberry

Yes



Planning vs. Planting

- A Critical Year In Fruit Production Is The One Prior To Planting – Don't Cut Corners
 - Soil/site preparation (pH, P, K, weeds, air drainage)
 - Use reputable nurseries
 - Don't compromise on varieties, rootstocks
 - Delay planting, custom propagation

Getting Started

- Start small –
 - Makes mistakes on a small scale
 - New technology & intense work can be overwhelming

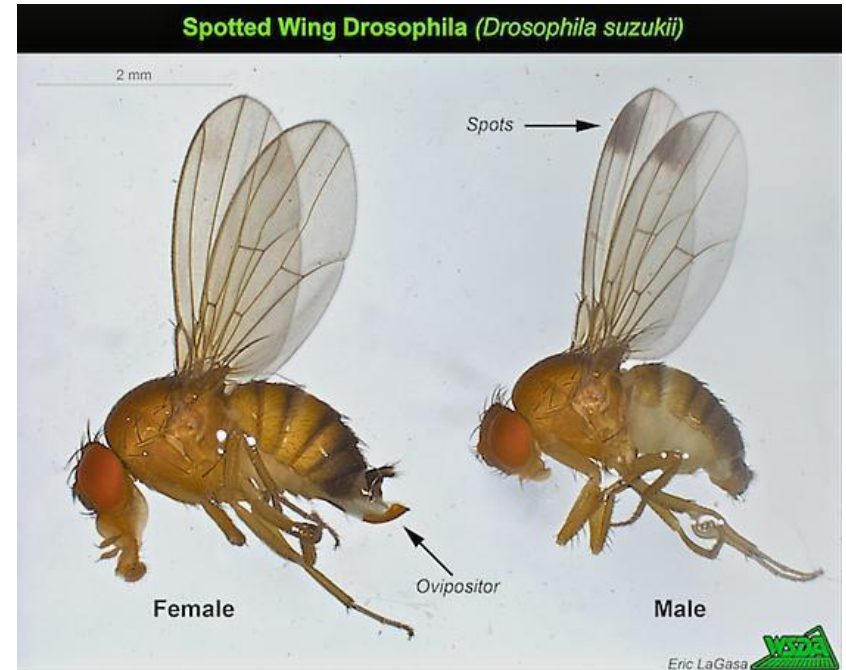


Constantly evaluate your market

- Consider alternative marketing strategies
 - Retail vs. wholesale
 - Agritourism
 - Pick-your-own
 - Value added

Ease of Pest Control

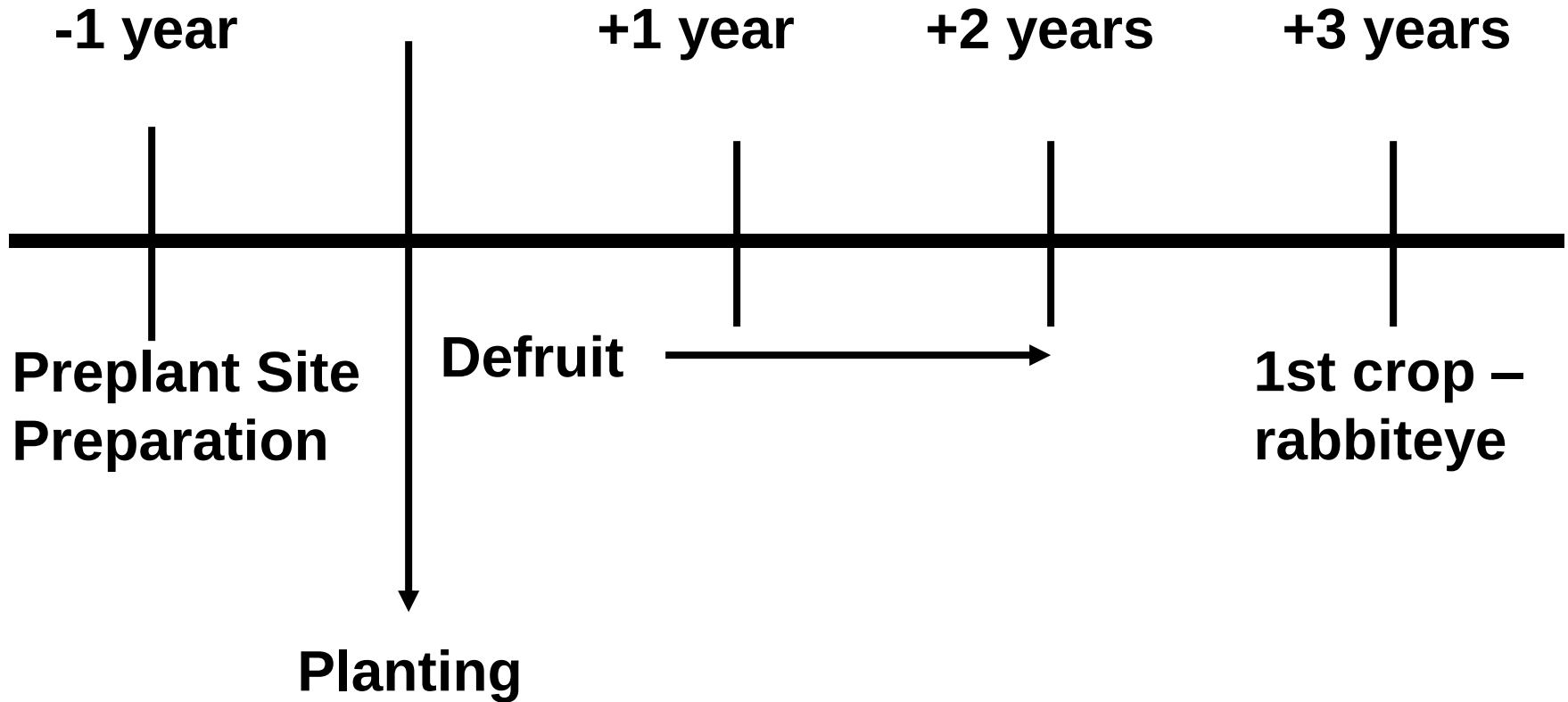
- Blueberries
 - Rabbiteye
 - Highbush
- Muscadines
- Blackberries
- Raspberries
- Grapes
 - American bunch
 - French-American hybrid
 - *V. vinifera*
- Stone Fruits
- Apples



Blueberries

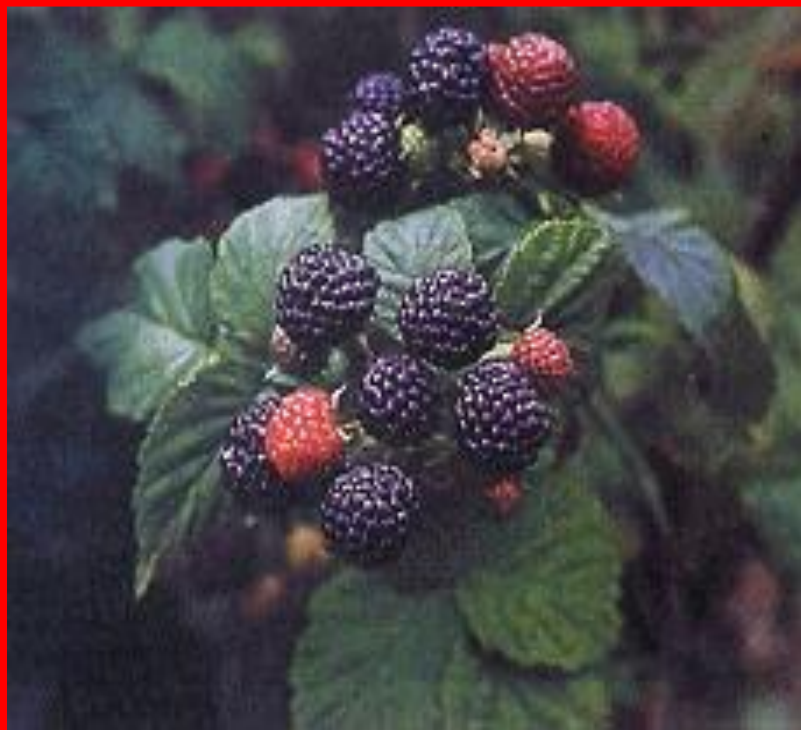
- Time to 1st crop: 3 years
- Time to full production: 6 to 8 years
- Expected yield: 8,000 to 10,000 lbs./acre
- Harvest period:
 - Mid-June to mid-July for highbush
 - Mid-July to Sept. for rabbiteye
- Productive lifespan: 30+ years

Blueberry Production Timeline





C A N E B E R R I E S



Biennial Life Cycle of Canes



- **Primocane Year**
 - Cane grows throughout summer
 - Fruit bud initiation occurs in late summer to early fall
- **Florican Year**
 - Fruit bud initiation is completed
 - Bloom
 - Fruiting
 - Cane death

Floricanne-bearing Blackberries

- **2nd year: partial crop**
- **3rd and succeeding years: full crop**
 - 6,000 to 8,000 lbs. or more**
- **Productive life: 8 to 10 years or more**

Trellis Systems



SWD Adults on Raspberry Fruit



Pam fisher, Berry
Specialist/OMAFRA

S T R A W B E R R I E S



Strawberries - Matted Row Culture

- Years to bearing : 1
- Expected life of planting: 3 to 4
- Expected yields: 25 plants can give in excess of 40 lbs. of fruit in one year after planting
- Varieties: Earliglow
Allstar



Plasticulture Strawberries



Plasticulture Strawberries - Planting

- Time:
 - In fall (last ½ of Sept. – 1st ½ of Oct. depending on location)
- What to plant:
 - Plant plug transplants or greenhouse runner tips
- Spacing:
 - 2 rows 12 in. apart on top of raised bed
 - plants 12 in. apart in the rows & offset 6 in. from plants in the adjacent row





Grapes



- Market options:
 - Wine
 - Table
 - Juice
 - Processing (jellies)

Seedless Grapes



Jupiter



Vanessa



Marquis

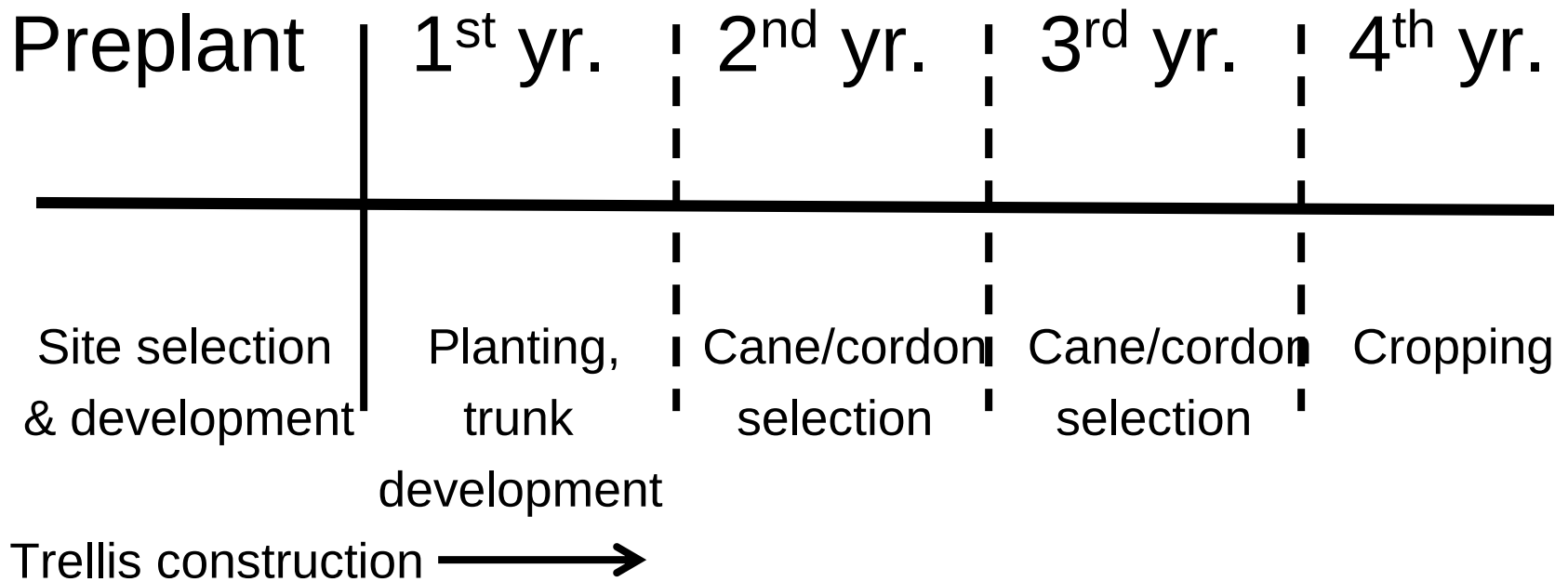


Neptune



Saturn

Vineyard Establishment



Grapes

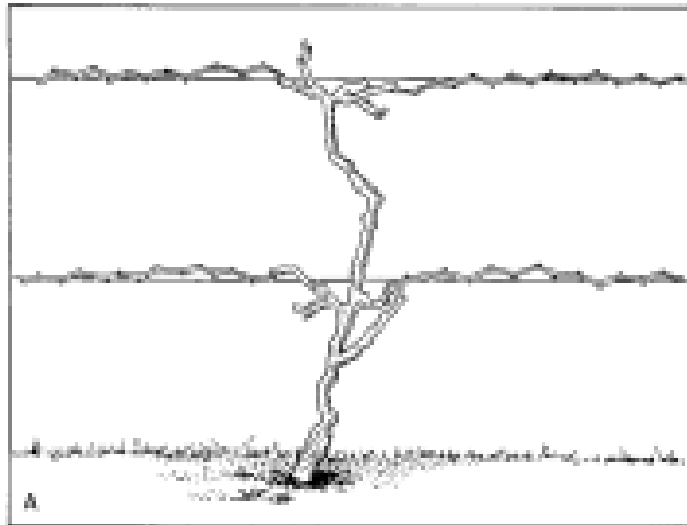
- Time to :
 - 1st harvest: 4 years
 - Full crop 5 to 6 years
- Expected vineyard life: 25+ years
- Establishment cost (excluding land) :
 - \$10,000 to \$12,000 per acre
- Annual production costs (excluding harvest):
 - \$1,500 to \$1,800 per acre

Grapes

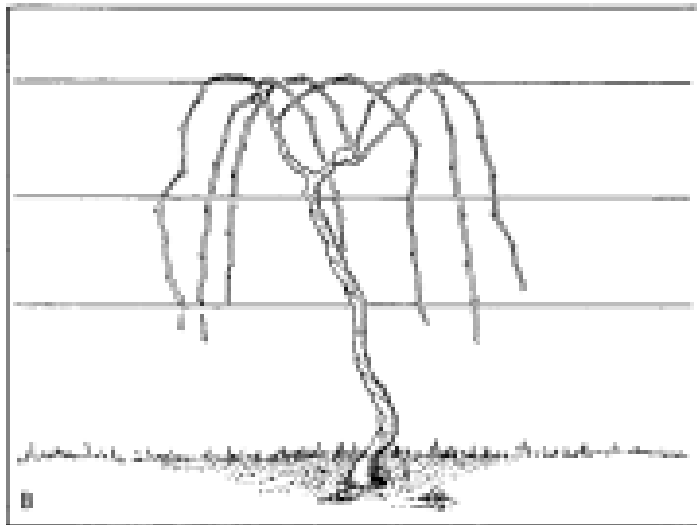
- Yield potential:
 - American bunch – 5 to 7 tons/acre
 - French American hybrids – 4 to 5 tons/acre
 - *Vitis vinifera* – 2 to 2.5 tons/acre
- Prices received by growers for wine:
 - American bunch - \$900 to \$1,000 per ton
 - French American hybrid - \$1,100 per ton
 - *Vitis vinifera* - \$2,000 to \$2,500 per ton

Grape Training Systems

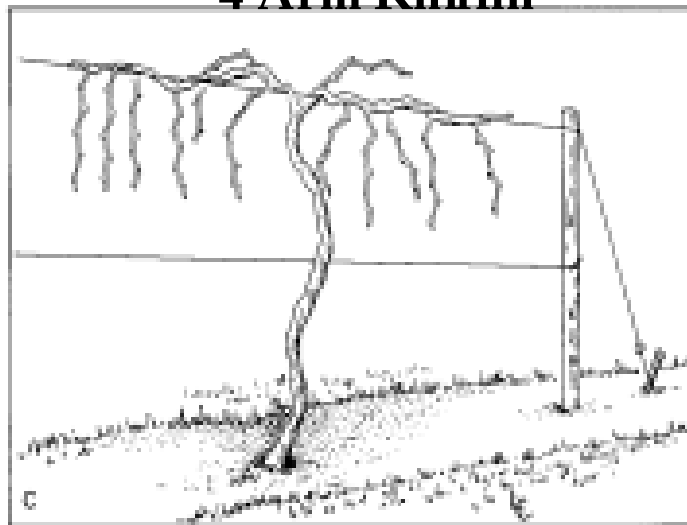
From Galleta & Himelrick,
Small Fruit Crop Mgt., 1990



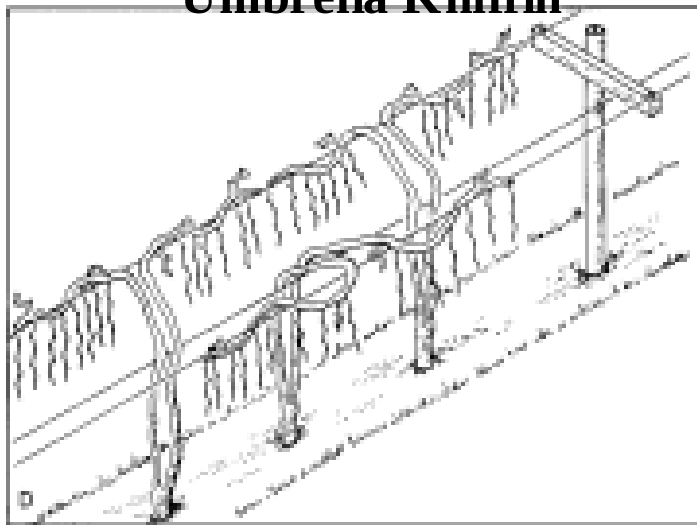
4 Arm Kniffin



Umbrella Kniffin



Single curtain cordon



Geneva double curtain

Season Extension

















**For successful apple
production,**





Apples

	<u>SEEDLING</u>	<u>SEMI-DWARF</u>	<u>DWARF</u>
Years to 1 st Crop	6 to 8	4 to 6	2 to 3
Years to Full Crop	12 to 14	9 to 11	5 to 6
Expected Orchard Life (years)	30+	20+	14+
Yield at Full Production	12 to 16 bu/tree (576 to 768 bu/A)	5 to 7 bu/tree 791 to 1210 bu/A	3 to 4 bu/tree 1360 to 1815 bu/A

Harvest Period: Late July (Lodi) through late October (Pink Lady)

Storage Life of Fruit: Early maturing apples have a storage life of only a few days. Late summer and fall varieties will last several weeks under proper storage conditions. Certain varieties such as Arkansas Black and Goldrush will last several months

Value-added opportunities: PYO, apple cider, baked goods, dried fruit

Why Graft Trees?

- Size control
- Increased precocity
- More consistent quality
- Higher yields?
- Uniformity
- Insect and disease resistance
- Cold hardiness
- Tolerance to certain soils (drought, excess H₂O, pH, salts)



Exhibit 4: Apple cultivar Zestar!™ on rootstocks B9, M26, and M7

Rootstock Effect on Tree Size & Precocity



Dwarf Geneva Apple Rootstocks –Comparison

<u>Traits</u>	G.65	G.11	G.16	G.41	G.214	G.935	G.202
Size →	M.27	M.9T337	M.9 T337	M.9 T337	M.9/M.26	M.26	M.26
WAA resistance	No	High	No	High	High	No	High
Fireblight Resistance	Very	Resistant	Resistant	Very	Very	Very resistant	Very resistant
Replant Disease	TBD	No	Partial	Tolerant	Tolerant	Tolerant	Tolerant
Phytophthora	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant
Cold Hardiness	Yes	Yes	Partial: Good mid Bad early	Yes	TBD	Yes	Good mid-winter
Productivity =/> M9	TBD	Yes	Yes	Yes	Yes	Yes	Yes
Suckering, burr knots	TBD	TBD	Yes	Yes	Yes	Yes	Yes

Scab-Resistant Apple Evaluations

- Rating Scale:
 - 1 = susceptible
 - 9 = immune
 - U = unknown

– Table taken from Adams County Nursery
2011-2012 Fruit Tree Catalog

Variety	Apple Scab	Cedar Apple Rust	Powdery Mildew	Fireblight
CrimsonCrisp™	9	6	4	4
Crimson® Gold	9	U	U	U
Liberty	9	8	8	8
Crimson® Topaz	9	U	6	4
Galarina	9	U	8	8
Freedom	9	7	7	6
Nova Spy	9	3	U	7
Querina™	9	3	7	7
Enterprise	9	8	6	8
WineCrisp™	9	5	6	8
GoldRush	9	3	7	5

SmartFresh™

- 1-methylcyclopropene (1-MCP, SmartFresh™)
 - Developed at NCSU
 - Ethylene inhibitor



Chamber for treating 4 bins with SmartFresh™



SmartFresh™ Ginger Gold Trial – 2010

30 days at room temperature



Peaches

- **Several pest problems**
- **Do not consider dwarf trees**
- **Select varieties with a long chilling requirement**
 - Contender
 - Nectar (white)
 - Carolina Gold (yellow)
 - China Pearl (white)
 - Intrepid (yellow)
- Others – Redhaven, Jefferson, Monroe, Cresthaven



Peaches

- ROOTSTOCKS: Halford, Lovell, Guardian
- SPACING: 14 X 22 (141 trees/acre) to 16 X 24 (113 trees/acre)
- TRAINING SYSTEM: Open Center
- TREE HEIGHT AT MATURITY: 8 feet
- YEARS TO 1ST CROP: 3
- YEARS TO FULL CROP: 6
- EXPECTED ORCHARD LIFE: 17
- YIELD AT FULL PRODUCTION: 3 bu/tree for early & mid-season maturing varieties, 4 bu/tree for later ripening varieties
- HARVEST PERIOD: June through mid-September
- STORAGE LIFE OF FRUIT: 1 week or less for ripe fruit



Peaches & Nectarines

- Harvest period: June 1 – Sept. 1
 - Most varieties ripening prior to July 4 are clingstone or semi-clingstone
 - Tree-ripened peaches are very fragile and have a short shelf life.
 - Store above 60° for a couple of days to preserve flavor
 - Storage about 40° F may result in development of a bitter taste

Peaches – Main Limitations

- Frosts/freezes –
 - Passive & active controls
- Diseases –
 - Brown rot
 - Bacterial spot
- Insects –
 - Borers
 - Plum curculio



Peach Insects

Trunk Borer



Oriental
Fruit Moth



White Peach
Scale



Plum
Curculio



Lesser
Peachtree
Borer



Pest Control Recommendations

- Apple:
 - Integrated Orchard Management Guide for Commercial Apples in the Southeast
- Peach:
 - Southeastern Peach, Nectarine and Plum Pest Management and Culture Guide



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John Deere Tractor – vineyard model





Prepruning Unit



