



GUIDELINES TO EVALUATE APPLES FOR COMMERCIAL PLANTING IN THE SIERRA NEVADA FOOTHILLS

Maximum elevations: 4,000 feet level terrain

Optimum elevation: 2,500 - 3,000 feet

Soil texture: Sandy loam, loam, silt loam, clay loam

Soil families: Excellent performance on Josephine. Other good soils are Musick, Aiken, Holland, Shaver, Sierra, Sites, Cohasset, Auberry

Acceptable drainage: Fair to good

Acceptable soil depth:

Minimum - 2 feet

Optimum - 4 feet (for fruit quality)

Slope: Neutral, south, southwest, west, east, slightly north

Row orientation: North to south is best for close in row tree spacing. Frost potential and steepness of slope would be overriding factors.

Water required: Inches per season (orchard with groundcover)

1000-1500 = 49 inches

1500-2000 = 44 inches

2000-2500 = 39 inches

2500-3000 = 36 inches

3000-3500 = 33 inches

3500-4000 = 31 inches

Add 10-15% for south, southwest slopes. Subtract 10-15% for north, northeast slopes. Add 25-30% for extra heavy cover crop. Add 20-30% to all irrigations to account for system losses and inefficiencies.

Note: Most foothill soils store 1.5 to 2 inches of water per foot from winter rainfall. This water and any rainfall during summer can be subtracted when calculating irrigation needs.

Temperature constraints: 28°F during bloom, bloom date important e.g. Granny Smith, empire and Gravenstein bloom early; Romes 4-5 weeks later.

Red apples don't develop red color at lower, hotter elevations and sunburn increases. Late maturing varieties such as Granny Smith and Fuji may not have adequate number of growing days to mature above 3000 feet elevation. Ridge tops provide better overall temperatures than valleys in the foothills.

Age:

- To bearing - 4 to 6 years
- Maximum bearing - 8 to 10 years
- Prime bearing years - 9 to 40 years

Varieties (in order of maturity):

Gravenstein, Paula Red, Akane, Golden Delicious, Red Delicious, Empire, Jonagold, Stayman, Red Rome, Granny Smith, Fuji.

Rootstocks:

- EMLA 106 - 1/2-2/3 size tree
- EMLA 111 - 2/3-3/4 size tree
- EMLA 7A - 1/2 size tree
- Seedling - standard tree size

Number of trees per acre: 200 to 400. Spacing from 15 feet square to 7 X 15'.

Irrigation methods:

- Micro sprinklers
- Under tree permanent set sprinklers
- Portable sprinklers
- Drip on nearly level ground (erosion can be a problem on steep slopes)
- Over tree permanent set sprinklers when frost protection is desired.

Yields:

- Fair - 10 tons per acre
- Good - 15 to 20 tons per acre
- Excellent - 25 tons per acre

Major diseases: Apple scab, powdery mildew, oak root fungus, phytophthora crown rot.

Persistent insect pests: Codling moth, San Jose scale, Rosy apple aphid.

Other common pests problems: Deer, meadow mice, gophers, birds

Culture:

- Training - Red varieties - central leader or two leader
- Green/ Yellow varieties - three or two leader

- Weeds - 1. Cultivation- followed by mowing.
- 2. Perennial grass cover crop (dwarf strains of rye, fescue, orchard grass).
- 3. Strip spray weeds in row and mow centers.

Pruning

Annual removal of excess current season growth and renew spurs on 5 year rotation.

Irrigation

8 to 12 sprinkler applications or at 60 c.b. on tensiometer (18 inch depth) for sprinkler and 30 c.b. for drip.

Spraying

5 to 9 applications

Establishment Costs:

Per Acre

Fencing	\$	200 - 400
Trees		800 - 1600
Irrigation System		400 - 1200
Materials		500 - 800
Labor		1000 - 1300
Miscellaneous		100 - 700

TOTAL \$ 3000 - 6000

Equipment Costs:

Per Farm

Part time farm (minimum)		1000
Full time farm		
New	\$	60,000 - 100,000
Used		15,000 - 20,000

Production Costs:

Per Acre

Cultural	\$	600 - 900
Harvest		500 - 700
Overhead		?

TOTAL 1100 - 1600

Annual Gross Income:

Per Acre

\$ 1000 - 4000

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