1. **Planting, Training, and Pruning**  
   Chapter 5  
   Text

2. **Design Objectives**  
   • Capture all possible sunlight  
   • Allow equipment room  
   • Major Factors:  
     – Climate  
     – Topography  
     – Cultivar and rootstock  
   • Minor factor: use of the fruit

3. **Spacing**  
   • Tropics - Low density  
     – 7 x 7 m   ( 7 x 7 = 49 )  
     • 10,000 / 49 = 205 trees ha\(^{-1}\)  
   • 9 x 9 m  
     – 10,000 / 81 = 125 tree ha\(^{-1}\)

4. **Spacing in Subtropics**  
   • 8 x 8 Florida  
   • 3 x 3 Japan  
   • 1.5 x 3 Central China (mountains)  
   • Factors involved  
     – Topography  
     – hu and freezes  
     – Water

5. **Design**  
   • Areas where large expanses of land  
   • Rectangularity is common  
     – Wide between rows  
     – Narrow within rows  
     • What does this lead to?  
   • 6 x 6 m & 3 x 12 m same tree density  
     – What is it?

6. **Orientation of Hedgerows**  
   • Orientation north to south
– More important with higher latitude
• Maintain tree height
  – No more than twice distance between canopy widths
• Distance between canopies 2 m
  – What is hedging height?

7 Density Definitions
• Low < 300 trees ha\(^{-1}\)
• Moderate 300 - 700 trees ha\(^{-1}\)
• High 700 - 1500 trees ha\(^{-1}\)
• Ultra high > 1500 trees ha\(^{-1}\)

8 Yield and Density
• Positive correlation between
  – Yields and number of trees ha\(^{-1}\)
• Yields of ultra high density higher
  – low density only for first 5 - 8 yr
  – Fig. 5.2 text

9 Having Your Cake and Eating it Too
• Mod to high density out yield low density for 15 - 20 yrs IF...........
  – Regular pruning
  – Hedging and topping
    • What does this do?
  – Remove trees within rows
    • Is this popular?

10 What is being used?
• 600 - 800 trees ha\(^{-1}\) economically optimum in CA for 3 - 7 yr navels
• 500 ‘Pineapple’ trees ha\(^{-1}\) over 15 yrs in Florida
• 84 pecan trees ha\(^{-1}\) in Texas

11 High Density Square or Rectangle Orchard
• Optimize light interception / unit area
• As tree grows
  – Canopy leaf area / tree
  – Canopy-bearing volume constant
    • or decreases with maturity

12 Hedgerow System
• As continuous hedge formed
  – Decrease of between row spacing
• Increases canopy surface area
  – And bearing volume

13 High Density
• Advantages
  • More efficient
    – Use of water, pesticides, nutrients
• Disadvantages
  • Equipment problems
  • Less penetration of spray materials
  • Hard to harvest

14 Planting
• Bare rooted trees
  – Do not allow roots to desiccate
• Dig close to planting time
  – Cover and keep moist at all times
• Keep container tree moist also
• Avoid phytophthora by budding high
• Do not plant too deep

15 Digging and Pruning
• Dig hole appropriate for tree
  – Avoid excessive root pruning
  – Avoid backfilling of large hole
• Barerooted trees - top pruned in nursery before digging
• Burlapped, balled, container trees not pruned

16 Planting
• Same depth
• Watered
  – Soil contact with roots
  – Remove air pockets
    • Avoid root desiccation
    • Avoid bringing scion to ground level

17 Field vs Container Trees
• Field grown trees grow off quicker
• Container grown trees catch up in 5 years