Pecan Production 101:

Physiology, Orchard Establishment, Cultivars, Training/Pruning

Lenny Wells

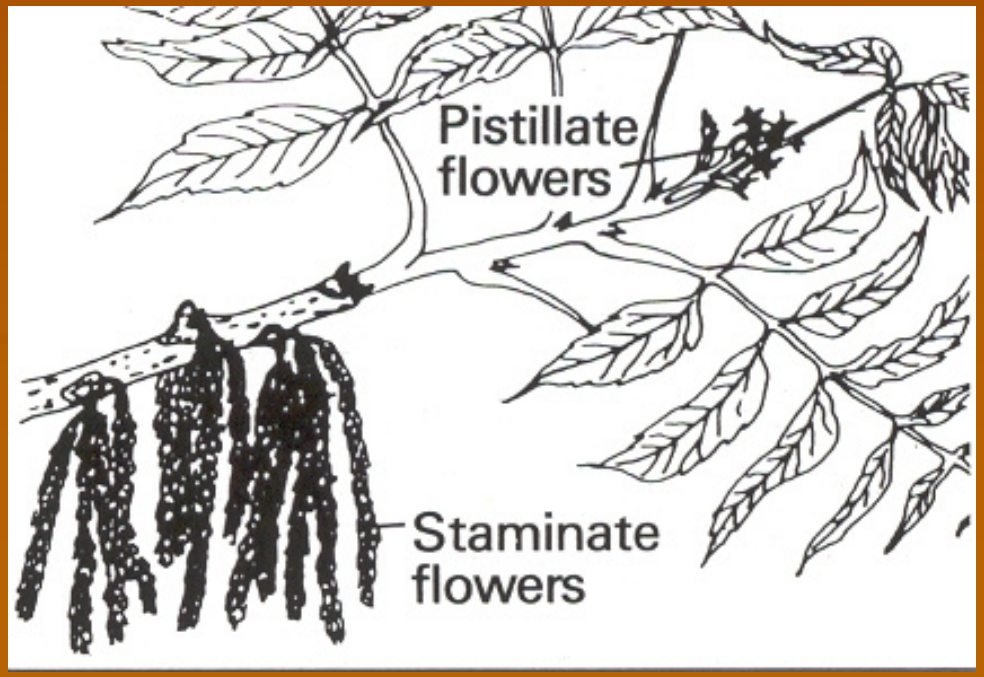
UGA Extension Horticulture

Chilling/Heating

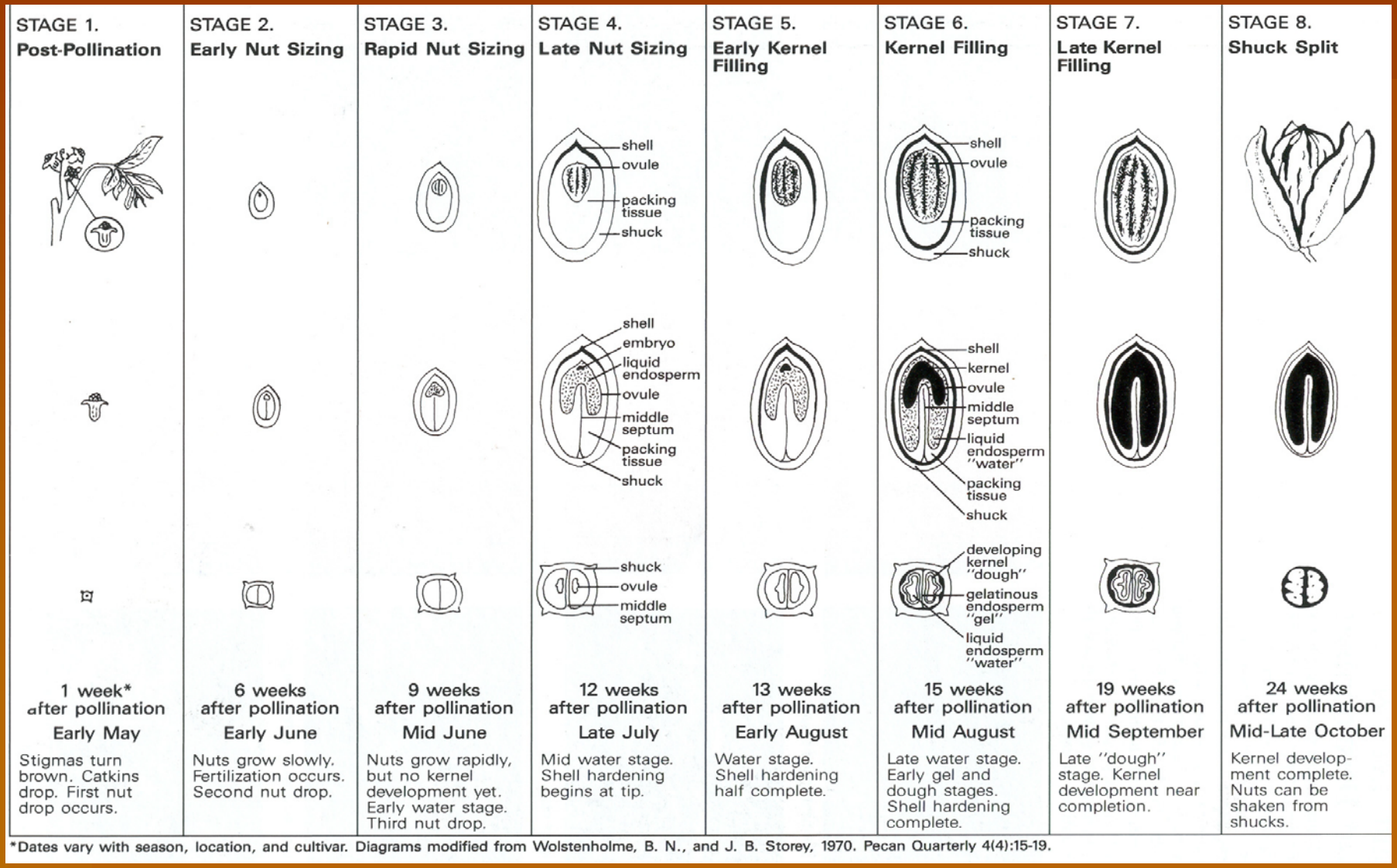
- As more chill hrs accumulate, less heat units required to stimulate budbreak
- Chill units less than 100 hrs leads to staggered budbreak
- March temperatures influence the time of budbreak
- April temperatures influence the rate of shoot elongation and pistil receptivity

Flowering

- Wind Pollinated, Monoecious, Heterodichogamous

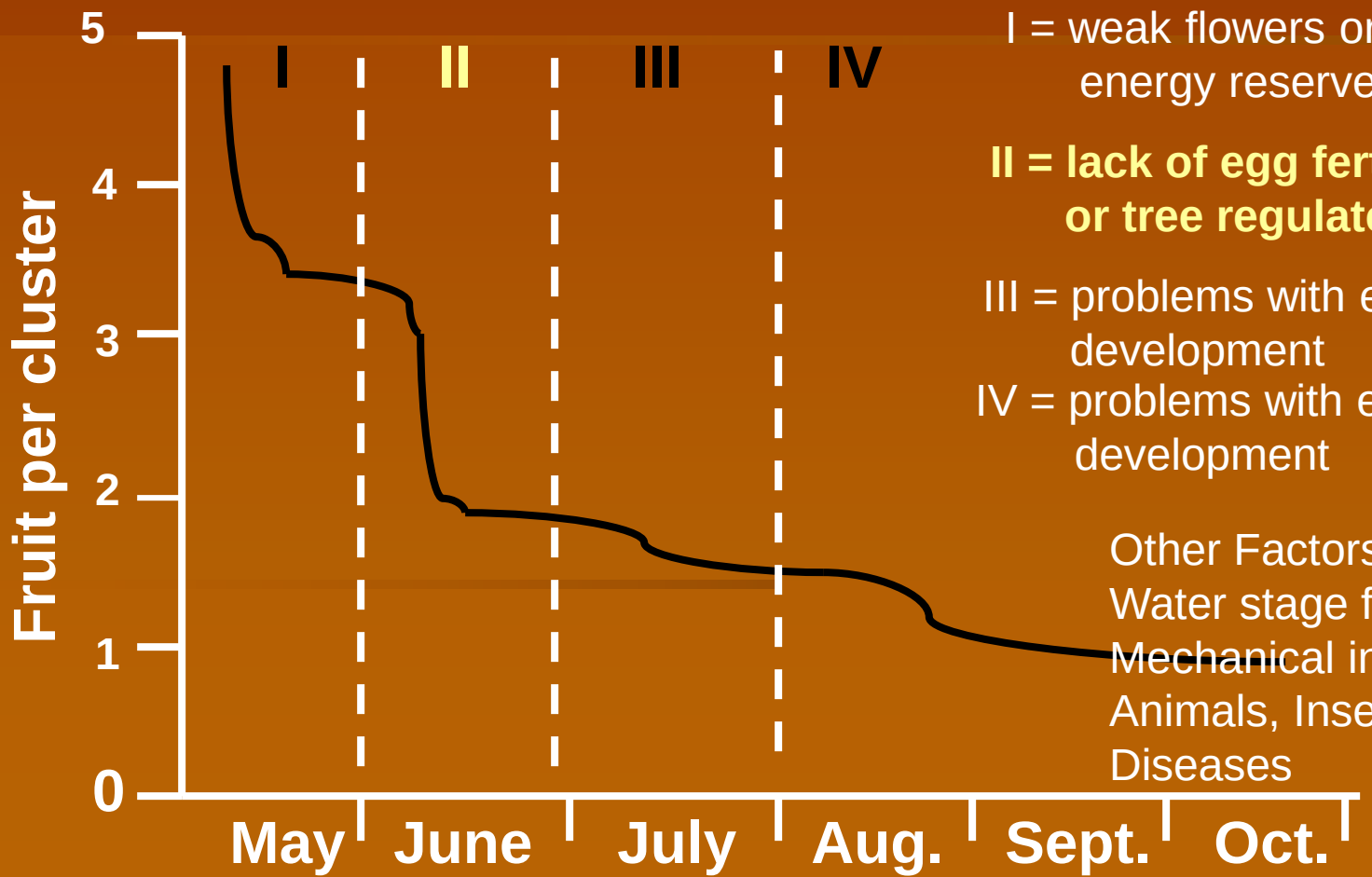


Nut Development



*Dates vary with season, location, and cultivar. Diagrams modified from Wolstenholme, B. N., and J. B. Storey, 1970. Pecan Quarterly 4(4):15-19.

Pecan Fruit-Drop Pattern



I = weak flowers or low energy reserves

II = lack of egg fertilization or tree regulated

III = problems with endosperm development

IV = problems with embryo development

Other Factors:
Water stage fruit split, Mechanical injury, Animals, Insects, Diseases

Alternate Bearing

- Affected by previous season's crop load and carbohydrate pool
- Female flowers are induced in August of the previous year
- Growth inhibitors (fruit stimulated) and promoters (foliage stimulated)
- Controlled at the Shoot Level

Alternate Bearing

- **Storage carbohydrates play a secondary role in alternate bearing**
- Low carbohydrate reserves may cause reversion of induced buds or abortion of female flowers
- High storage levels of carbohydrates do not necessarily lead to profuse flowering.

Orchard Establishment

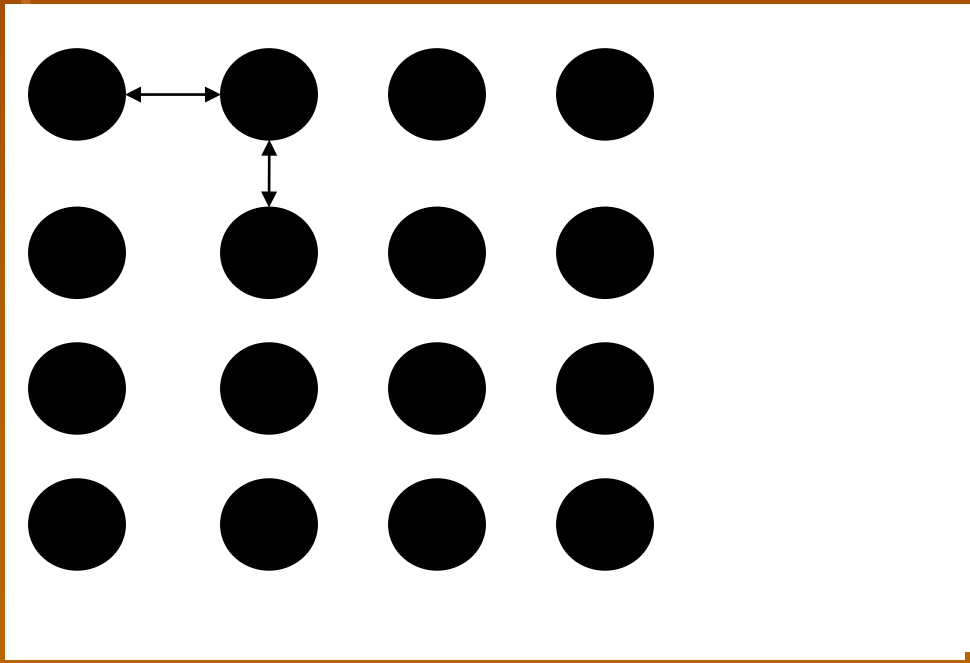
- Soil & Site Characteristics
- Land Preparation
- Orchard Design
- Tree Planting
- Fertilizer & Irrigation
- Weed Control

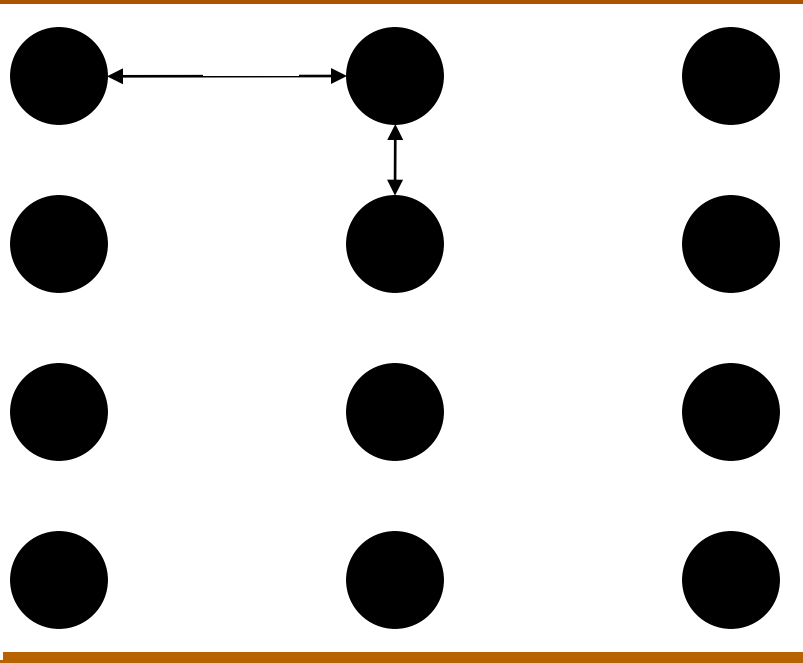
Orchard Establishment

- Soil & Site
  - Well drained soil
  - Sandy loam topsoil/clay subsoil
  - Shallow water table limits root growth
  - Plant on nearly level or gently sloping land
  - Avoid low areas for scab susceptible varieties

Orchard Establishment

- Orchard Design
  - Trees per acre = 43560/row width x tree width





Spacing should be based on level of management

Orchard Establishment

- Orchard Design
  - Temporary/Permanent Trees
  - Pollinators

Orchard Establishment

- Planting
  - Seed/grafting
  - Containerized
  - Bare Root

Orchard Establishment

- Bare Root Transplants
  - December-March
  - Protect Roots
  - Planting Depth
  - Bark Protection

Orchard Establishment

- Care of Newly Transplanted Trees
  - Water, Water, Water
  - Herbicide, Herbicide, Herbicide
  - If good growth is obtained, apply 1 lb 5-10-15 per tree in June

Weed-free Area Required around Young Pecans for Optimum Growth and Yield

- Minimum 7 ft square in first year
- 10 ft square in subsequent years

Factors to Consider When Choosing a Pecan Cultivar

- Disease Resistance
- Alternate Bearing
- Precocity
- Nut Maturity Date
- Pollination Type
- Nut Size & Quality

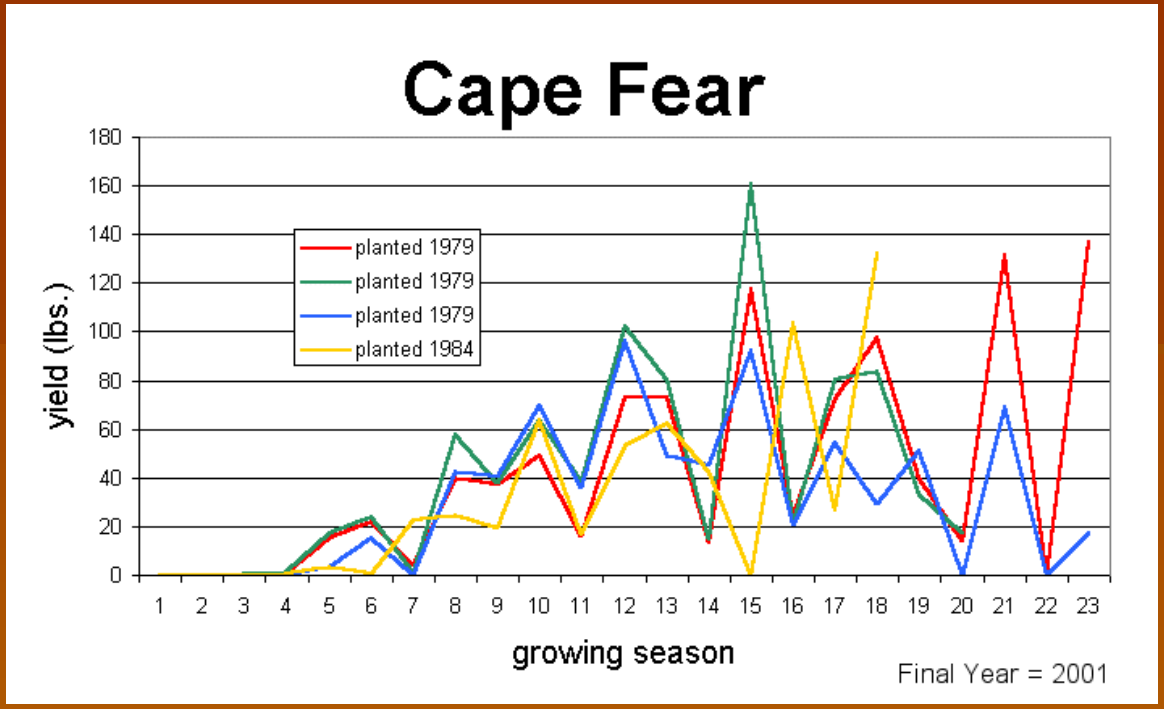
Quality factors of pecan

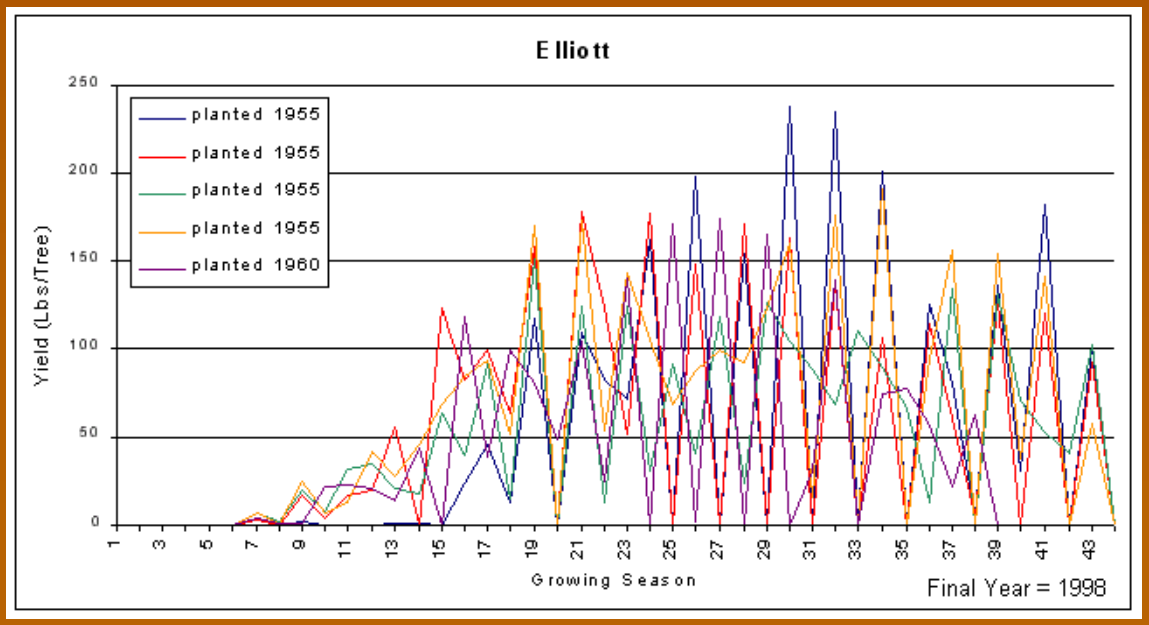
- Nut Size
  - Generally sold as # nuts per pound
    - Large – 55 or less nuts per pound
    - Medium – 55-70 nuts per pound
    - Small – 71 or more nuts per pound

Quality factors of pecan

- % Kernel = (kernel weight / nut weight) X 100
  - Thicker shells reduce percent kernel.
  - Each cultivar has a characteristic percent kernel.
  - Higher percent kernel = better developed kernel = more oil and flavor.

- High % kernel
- Medium % kernel
- Undeveloped kernels


Cape Fear
yield (lbs.)
growing season
planted 1979
planted 1979
planted 1979
planted 1984
Final Year = 2001


Elliott
Yield (Lbs/Tree)
Growing Season
planted 1955
planted 1955
planted 1955
planted 1955
planted 1960
Final Year = 1998

Caddo*

- 67 nuts/lb
- 54% Kernel
- Matures Oct. 11
- Scab Rating = 3
- Alternate Bearing Index = 0.32
- Precocity = 2

Pollinated by Elliot, Kanza, Moneymaker, Schley, Stuart, Sumner

Preferred by Black Aphids

Cape Fear*

- 55 Nuts/lb
- 51% Kernel
- Matures Oct. 19
- Scab Rating = 3
- Alternate Bearing Index = 0.41
- Precocity = 1

- Pollinated by Elliott, Kanza, Schley, Stuart, and Sumner
- Needs to be fruit thinned as a mature tree
- Sensitive to crowding
- Bacterial Leaf Scorch may be a problem

Desirable

- 48 nuts/lb
- 51% Kernel
- Matures Oct 16
- Scab Rating = 5
- Alternate Bearing = 0.4
- Precocity = 3

- Pollinated bu Elliot, Kanza, Sioux, Sumner, Stuart
- High Maintenance (Scab)
- Consistent, high quality crops
- Requires training of young trees

Elliott*

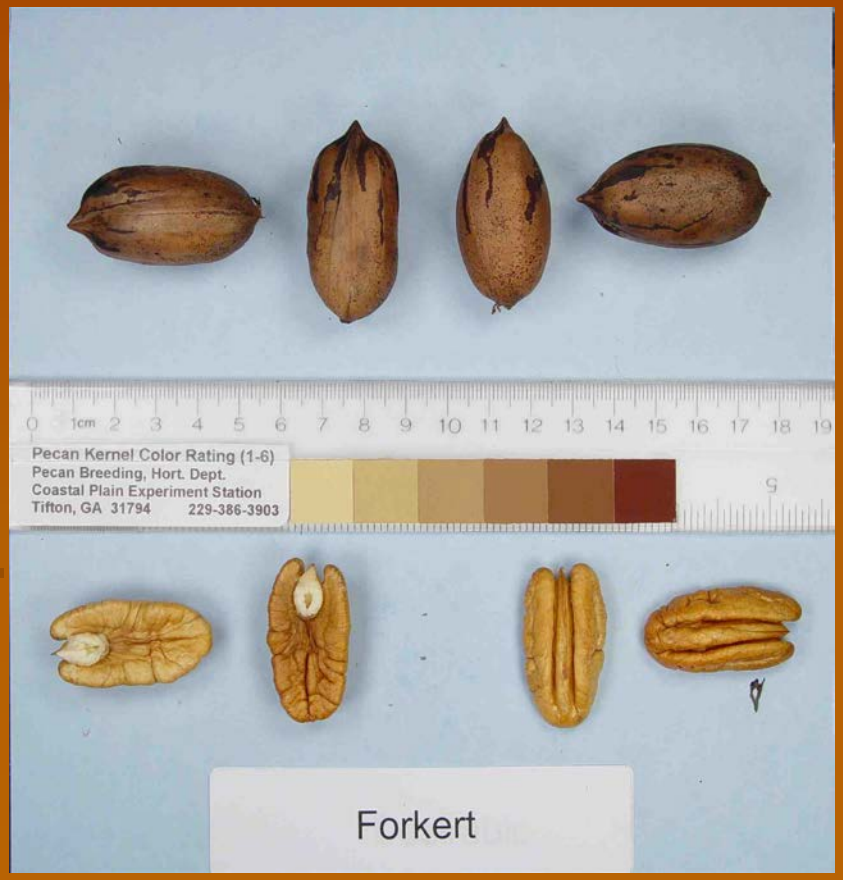
- 77 nuts/lb
- 51% Kernel
- Matures Oct. 15
- Scab Rating = 1
- Alternate Bearing Index = 0.68
- Precocity = 5

- Pollinated by Caddo, Desirable, Pawnee, and Oconee
- Requires little to no scab protection
- Susceptible to Powdery Mildew, Black Aphids, Sooty Mold
- Drought Resistant
- Low Input

Forkert*

- 53 nuts/lb
- 58% Kernel
- Matures Oct. 19
- Scab Rating = 4
- Alternate Bearing Index = 0.53
- Precocity = 4

- Pollinated by Cape Fear, Elliott, Kanza, Kiowa, and Sumner
- Thin shell, shells out well
- Deteriorates rapidly when not harvested on time
- Susceptible to Black Aphids



Kanza*

- 74 nuts/lb
- 52% Kernel
- Matures Oct. 8
- Scab Rating = 1
- Alternate Bearing Index = 0.72
- Precocity = 4

- Pollinated by Caddo, Desirable, Oconee, and Pawnee
- Similar to Elliott, better Precocity
- Excellent Cold Tolerance

Oconee*

- 48 nuts/lb
- 53% Kernel
- Matures Oct. 12
- Scab Rating = 3
- Alternate Bearing = 0.37
- Precocity = 3

- Pollinated by Cape Fear, Schley, Stuart
- Susceptible to Black Aphids
- Do not crowd

Pawnee*

- 56 Nuts/lb
- 54% Kernel
- Matures Oct. 3
- Scab Rating = 5
- Alternate Bearing = 0.61
- Precocity = 4

- Pollinated by Forkert, Gloria Grande, Kiowa, Schley, Stuart, Sumner, and Sioux
- Needs Fruit Thinning
- Scab can be a problem

Sumner*

- 56 Nuts/Lb
- 49% Kernel
- Matures Oct 29
- Scab Rating = 2
- Alternate Bearing Index = 0.56
- Precocity = 4

- Pollinated by Cape Fear, Desirable, Oconee
- Late Harvest Date
- Black Aphid Suseptible

Creek

- 55 Nuts/Lb
- 48% Kernel
- Matures Oct 18
- Scab rating = 2
- Alternate Bearing = 0.68
- Precocity = 1

- Pollinated by Elliott, Schley, Sioux, Stuart
- Need to be fruit thinned
- Performs well in shade
- Good temporary tree

Kiowa

- 48 Nuts/Lb
- 53% kernel
- Matures Oct 21
- Scab rating= 3
- Alternate Bearing = 0.65
- Precocity = 2

Pollinated by Cape Fear, Desirable, Pawnee, Caddo

Alternate Bears as mature tree

Difficult to fruit thin

May be more susceptible to mouse ear than other varieties

Stuart

- 55 Nuts/lb
- 46% Kernel
- Oct 16
- Scab Rating = 3
- Alternate Bearing = 0.47
- Precocity = 5

- Pollinated by Cape Fear, Creek, Desirable, Elliott, Schley
- Marginal nut quality
- Sooty mold buildup

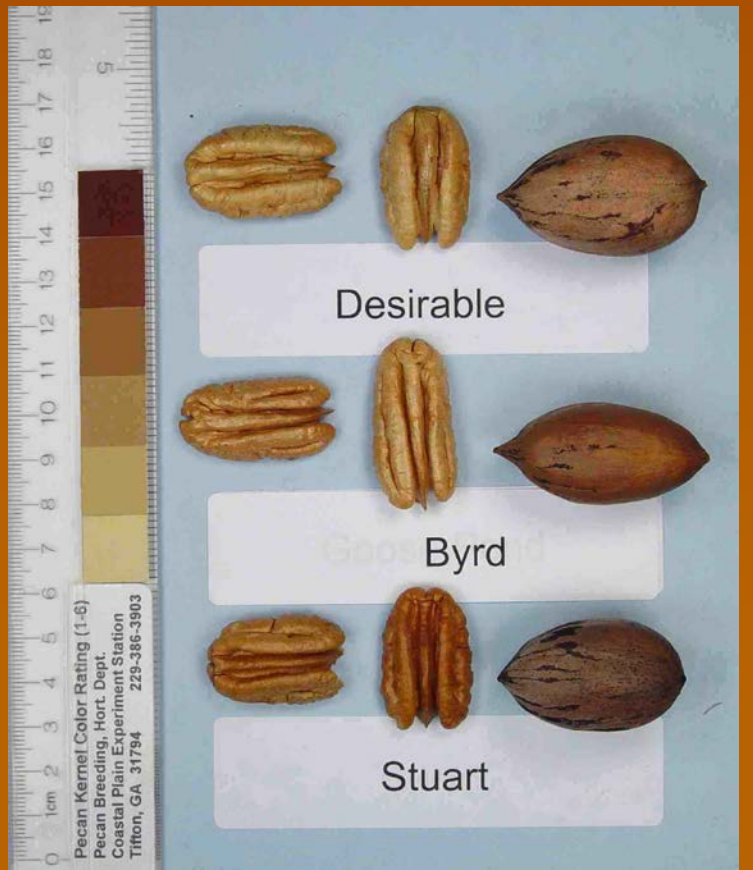
Excel

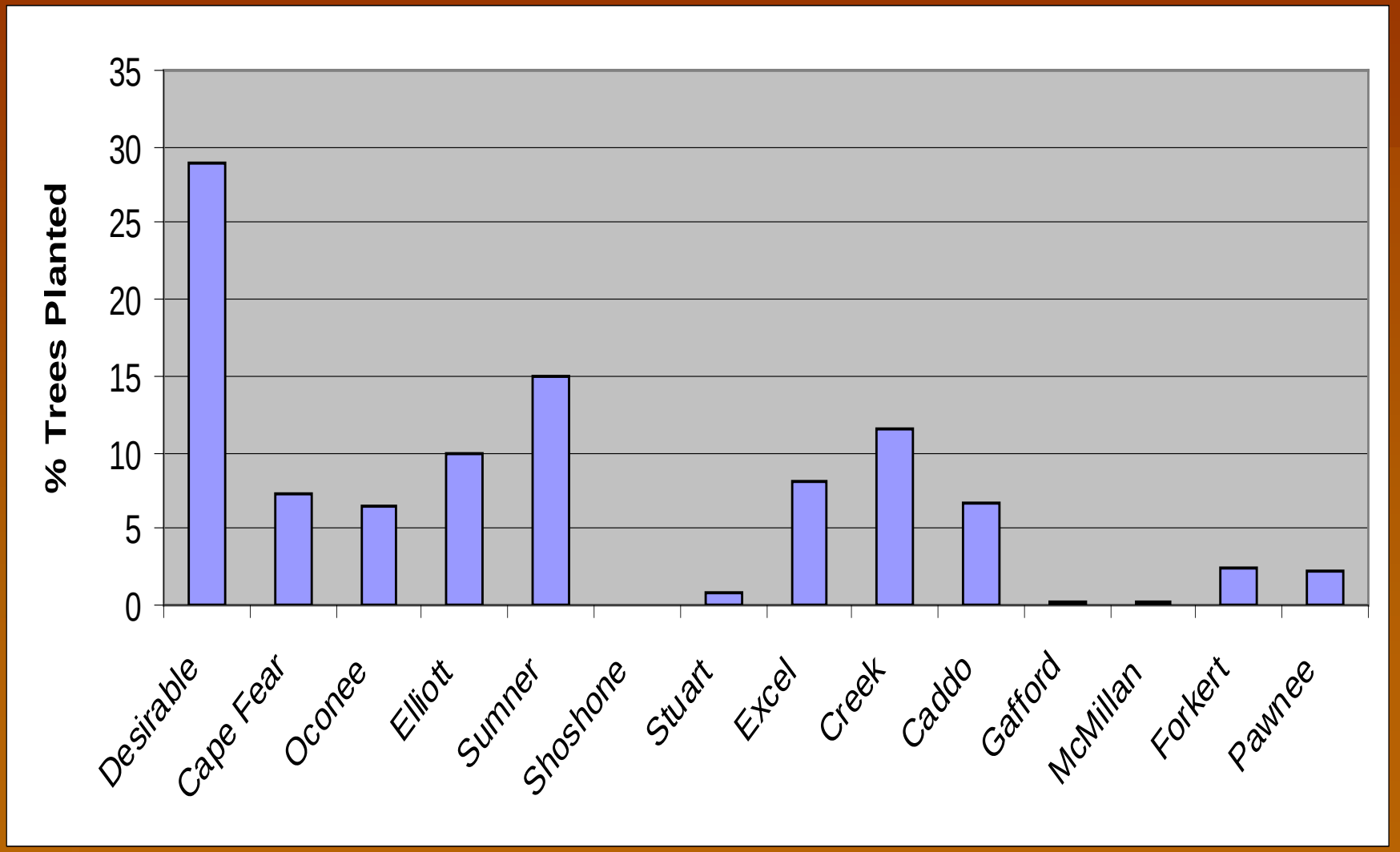
- 45 nuts/lb
- 49% Kernel
- Matures Oct 1
- Scab Rating = 1
- Alternate Bearing= ?
- Precocity = ?

- Pollinated by Caddo, Creek, Cape Fear, Desirable, Oconee, Pawnee
- Thick Shell; Bright Color

Byrd

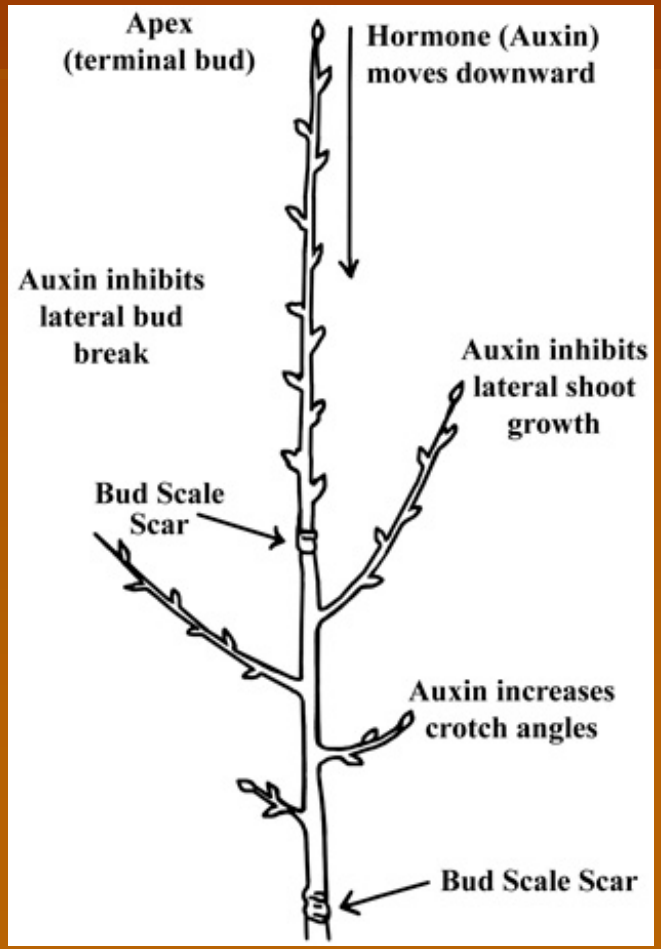
- Available in 2009
- ‘Pawnee’ x ‘Desirable’
- 58 nuts / lb 62% kernel : 2 days after ‘Pawnee’ (Oct 5)




% Trees Planted
35
30
25
20
15
10
5
0
Desirable
Cape Fear
Oconee
Elliott
Sumner
Shoshone
Stuart
Excel
Creek
Caddo
Gafford
McMillan
Forkert
Pawnee

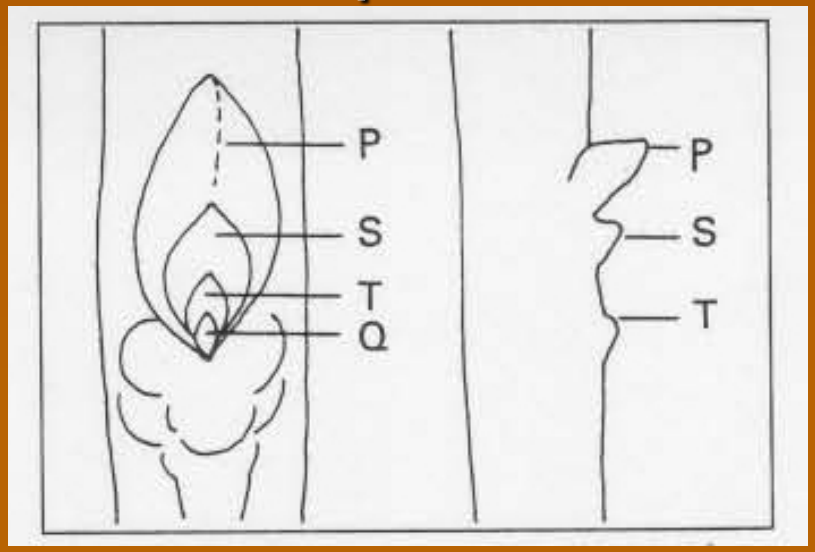
Pruning

- Auxin drives apical dominance
- Pruning temporarily removes apical dominance



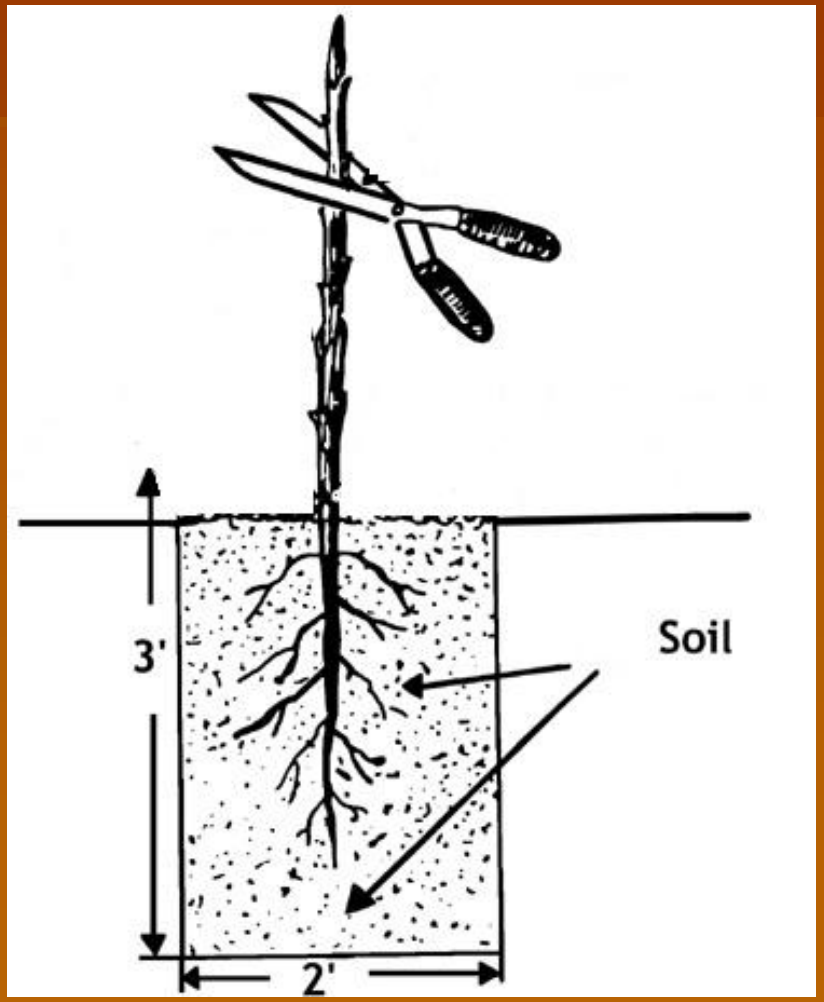
Developing tree shape

- Train to a central leader
- Primary bud should be allowed to develop into central leader
- Secondary buds should develop into scaffold limbs



At-Planting

- Cut top of tree back buds/limbs1/3
- Remove lateral buds/limbs



2nd year Training

- Remove limbs with weak angles (>60 degrees)
- Remove Crow's Feet
- Try to develop permanent scaffold limbs at 18" spacings
- Cut back central leader just below point where buds begin to cluster tightly
- Tip permanent scaffold limbs

Third Year and Beyond

- Remove any limbs that are >1/2 the size of the central leader.
- Continue training to a central leader

Pruning Mature Trees

- Remove damaged and low limbs that interfere with spray equipment
- Pruning to open up sunlight is delaying the inevitable!
- Cut all the way back to next main limb or central leader

Pruning Mature Trees

- Cut all the way back to next main limb or central leader