Impact of Nitrogen Rate on Vegetative Growth

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Peach Production in Florida

- Nitrogen important in proteins, DNA, chlorophyll (photosynthesis)
- Fertilizer amounts have been adapted from other regions
  - Climate differences
    - Temperate vs. subtropical
  - Other crops
    - Annual vs. perennial growth
  - Current recommended rate (UF/IFAS) = 100 lbs. N/ac annually
- Disease – tree health link?
  - Botryosphaeria
  - Other pests

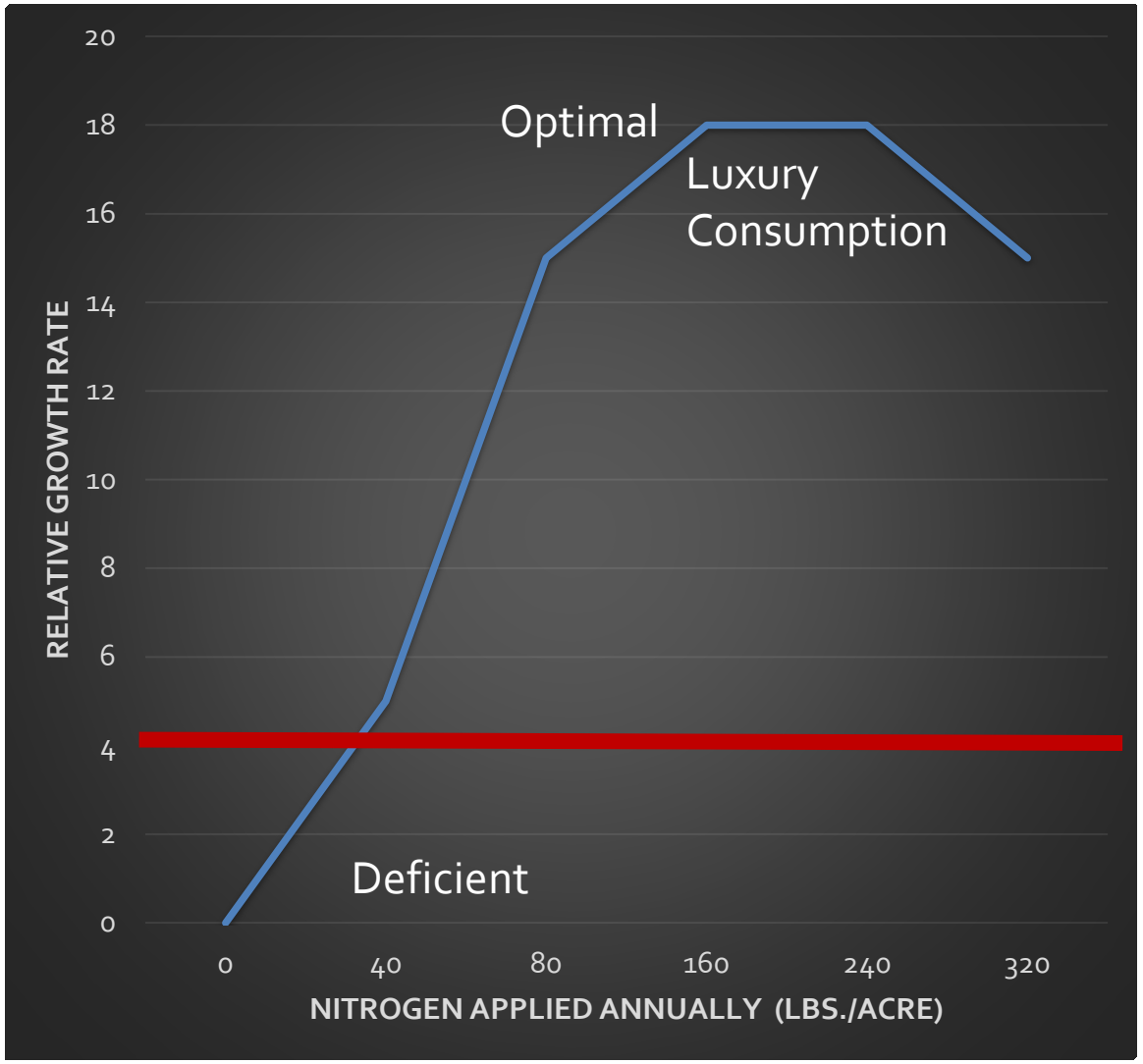
Nitrogen Effects

- High nitrogen = increased tree vigor → small fruit
  - Problems with flower set
- Too little nitrogen = deficiency
- Overall yellowing in the tree
  - Red spots on leaves, red in margins

Johnson, 2008

LaRue and Johnson, 1989

Nutrient Rates and Plant Growth



Climate Effects on Plant Growth

- Florida is classified as humid subtropical to tropical
- High humidity
  - Causes rapid growth rate
- Annual peach shoot growth is 8-9 feet
  - Summer pruning
  - Winter pruning
- Can we reduce to one pruning pass with N management?
- How much N should we use to manage vigor and optimize fruit yield/size?

Materials and Methods

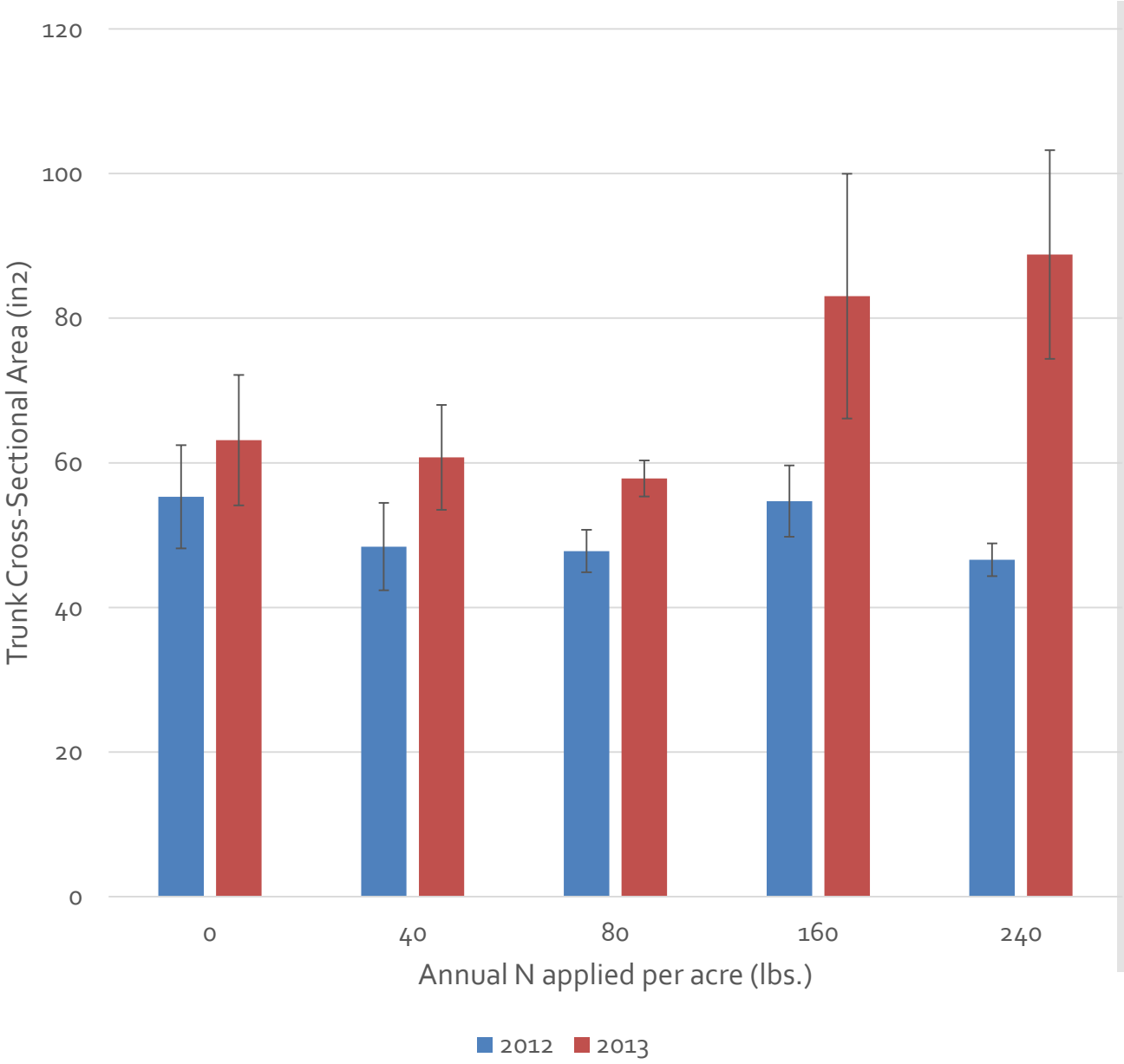
- 'TropicBeauty' x 9-4 (Greenleaf Flordaguard)
- Planted in 2005
- Previously fertilized with composted manure
  - Chicken litter and plant material
- 5 nitrogen rates applied annually
  - Broadcast
  - 0 lbs. / ac
  - 40 lbs./ac
  - 80 lbs./ac
  - 160 lbs./ac
  - 240 lbs./ac
- All receive 33 lbs. Phosphorus and 67 lbs. Potassium per UF/IFAS recommendations


N4 (240 lbs N/year)
No (0 lbs N/year)

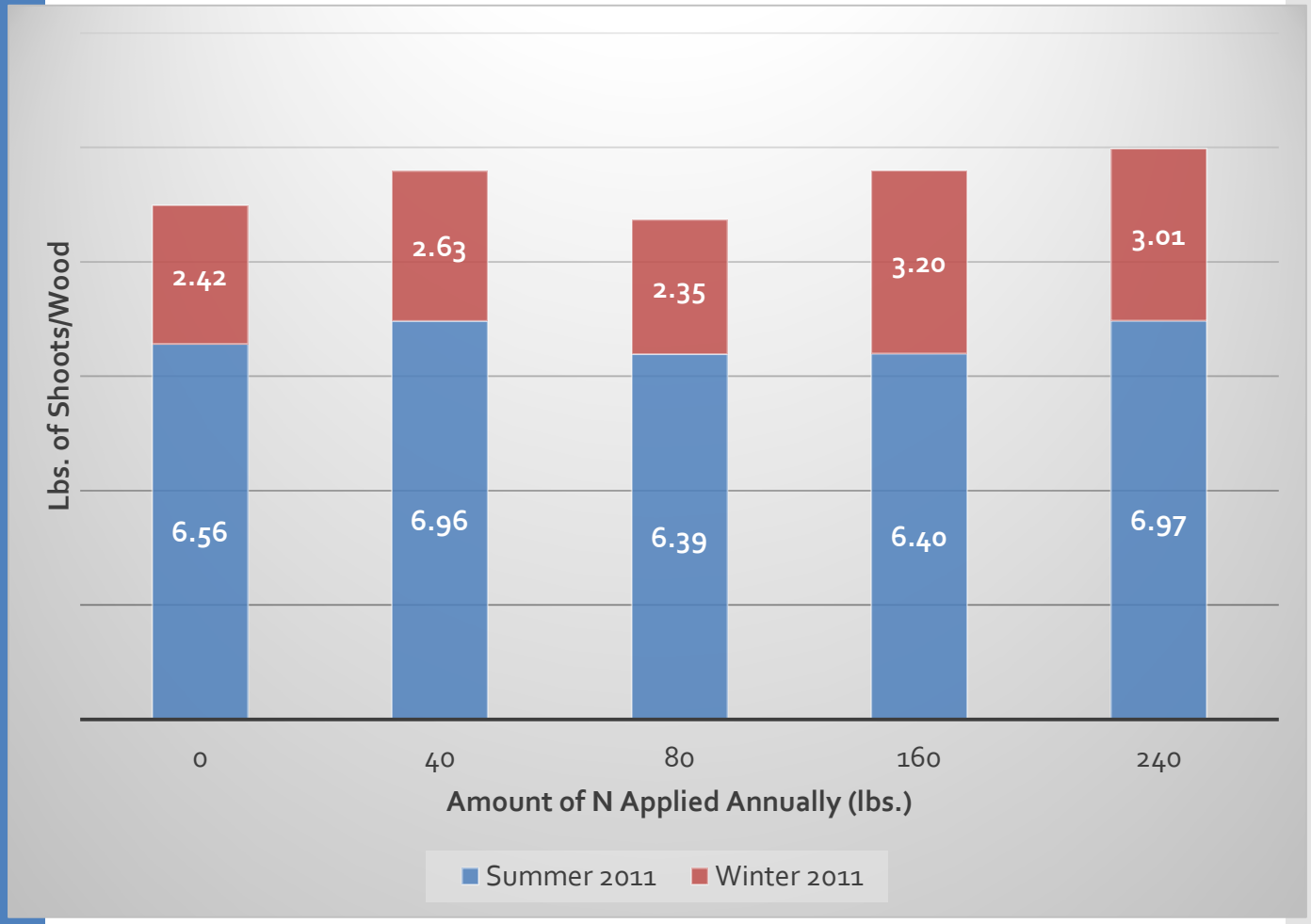
Trunk Cross-Sectional Area (TCSA)

- Measure of the trunk diameter = relative growth of tree
- Use it in conjunction with yield to calculate yield efficiency
  - TCSA/Yield = Yield Efficiency
  - Amount of fruit in relation to tree growth

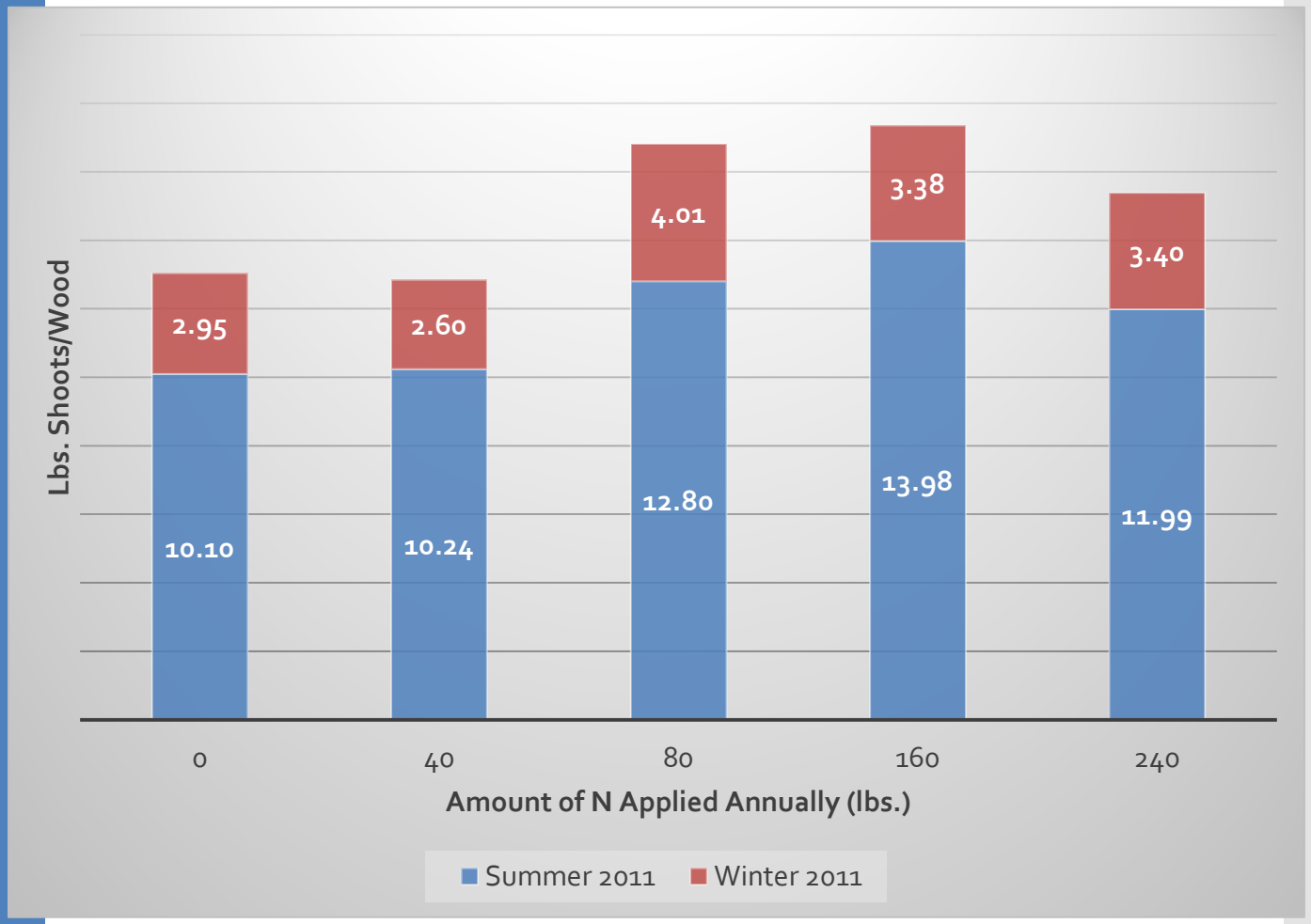
TCSA in Mature Orchard



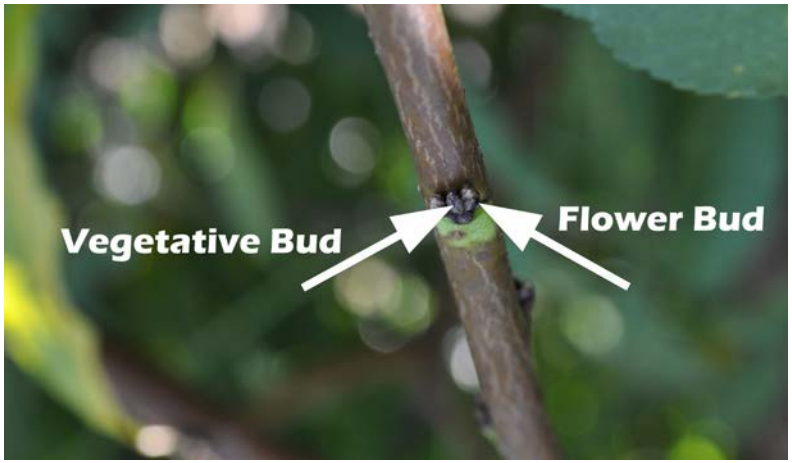
2011 Pruning Weight



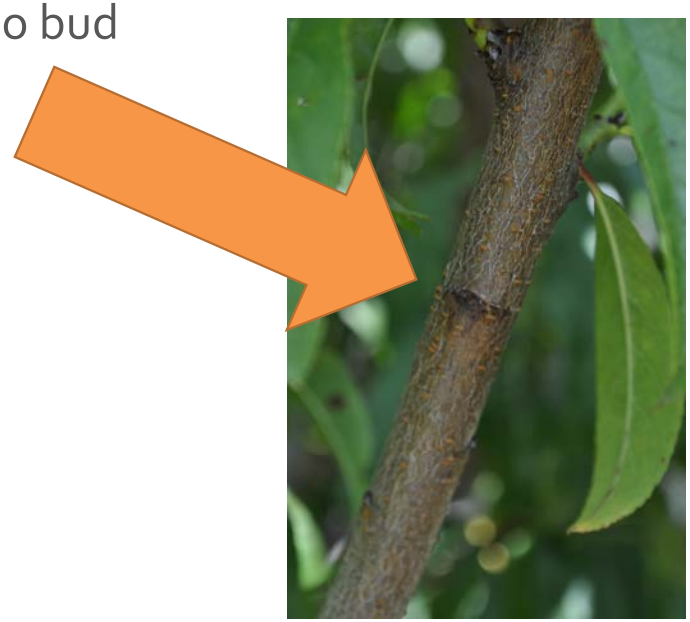
2012 Pruning Weight



Bud Distribution

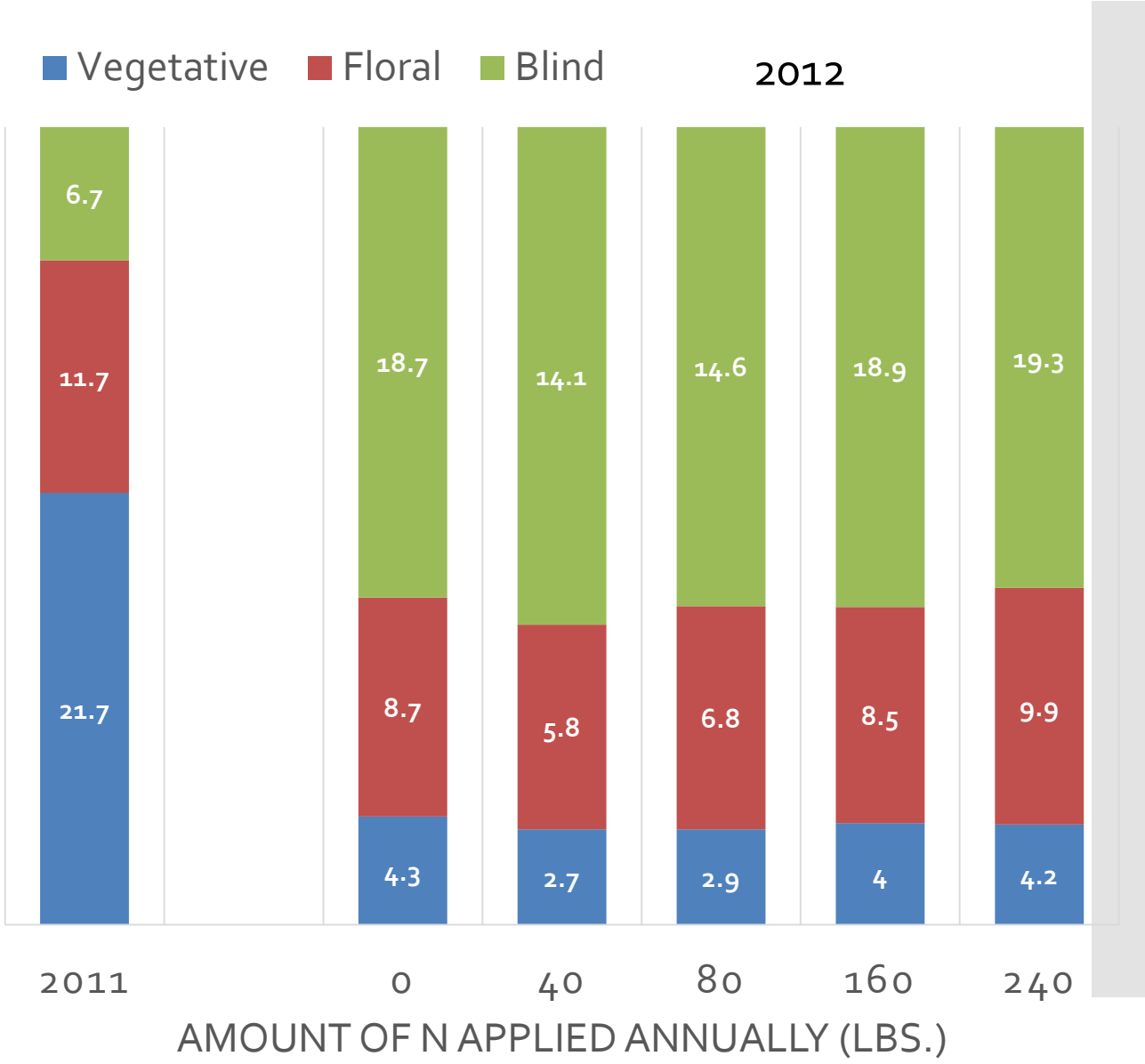


- Vegetative – growing points for shoots
- Floral – fruit production
- Blind nodes – no bud



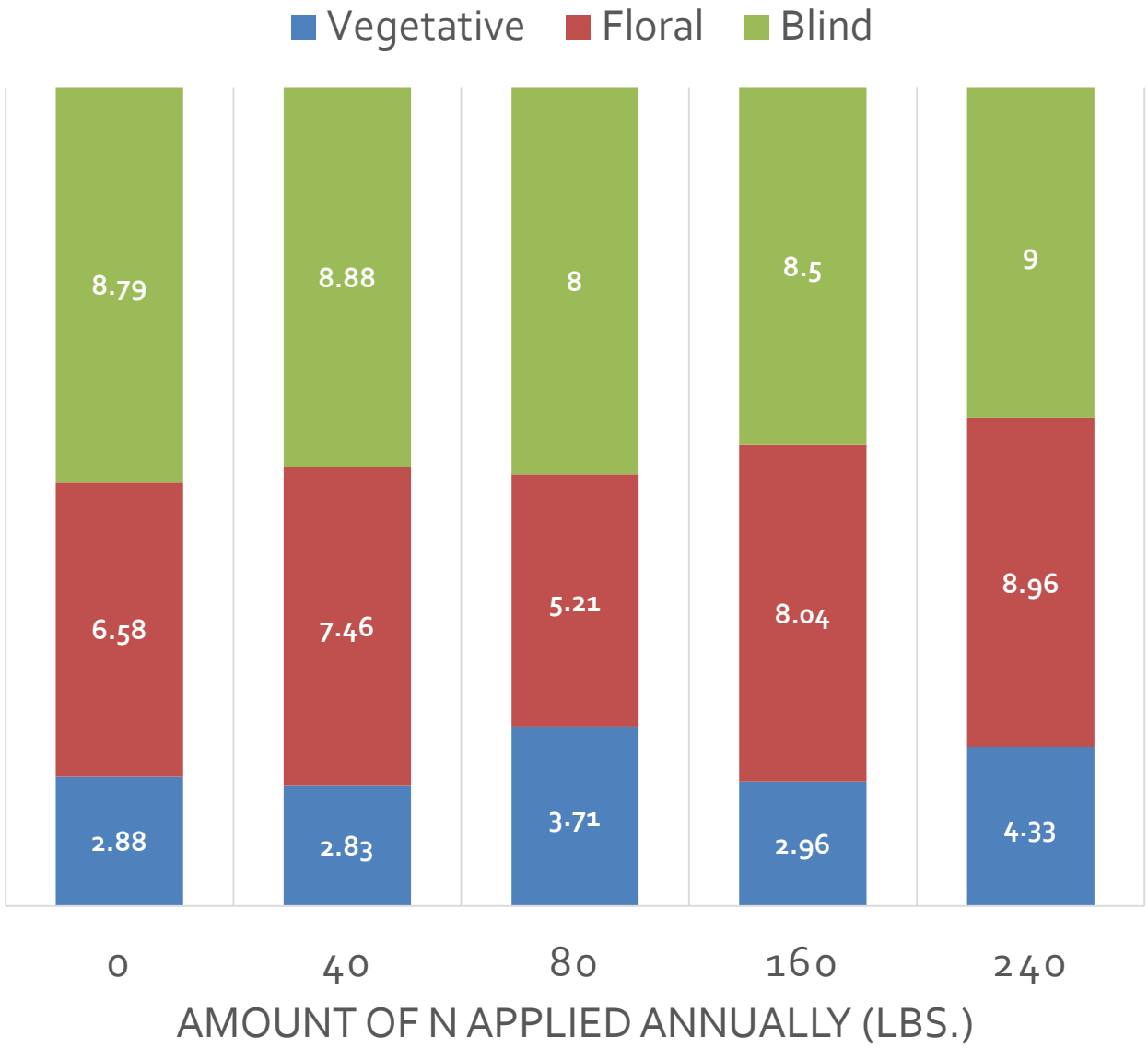
Bud Distribution in Mature Orchard

1 year old growth



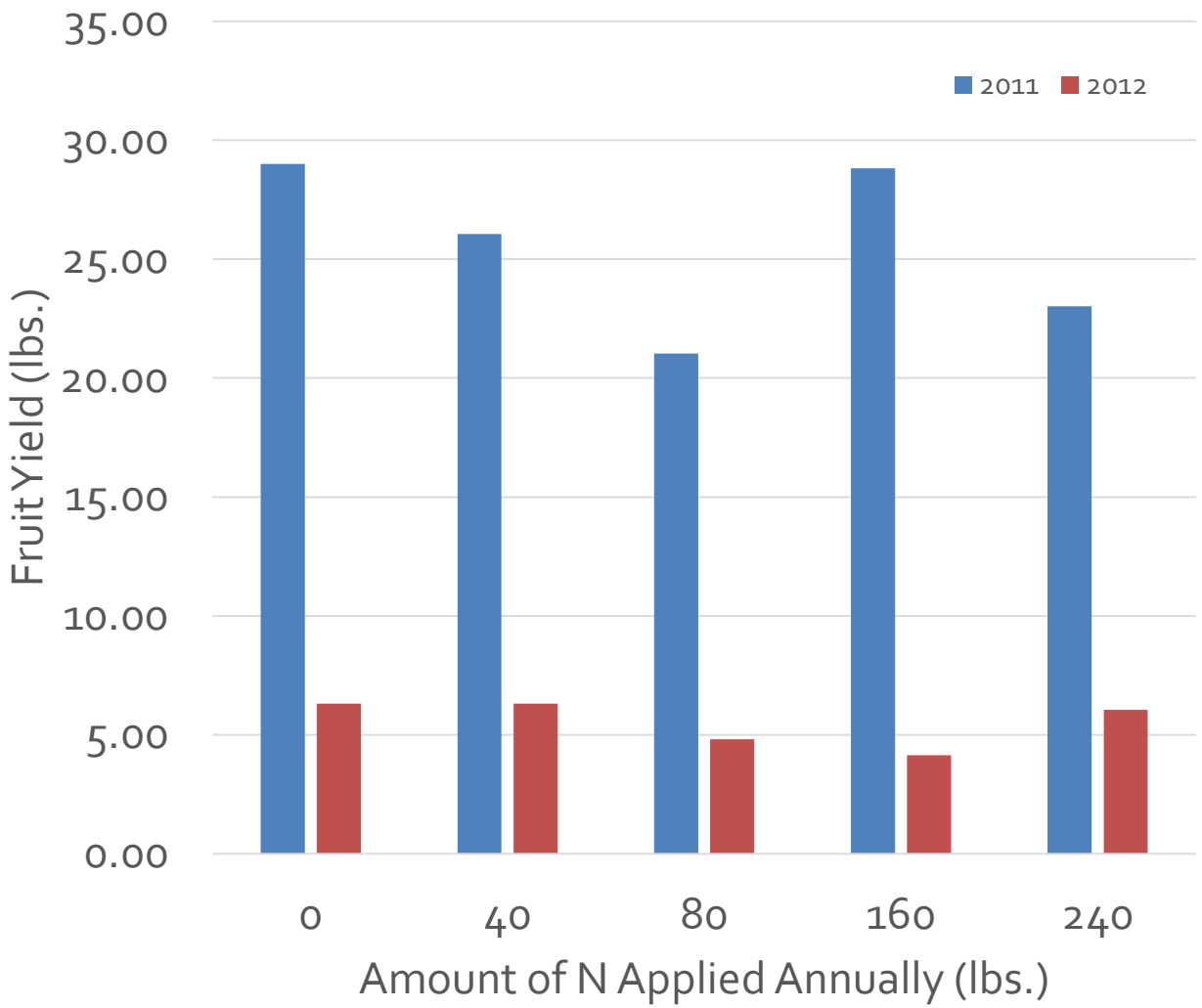
Bud Distribution in Mature Orchard

2013



Yield

*2012 = 80% reduction due to freeze events (Feb. 12/13)

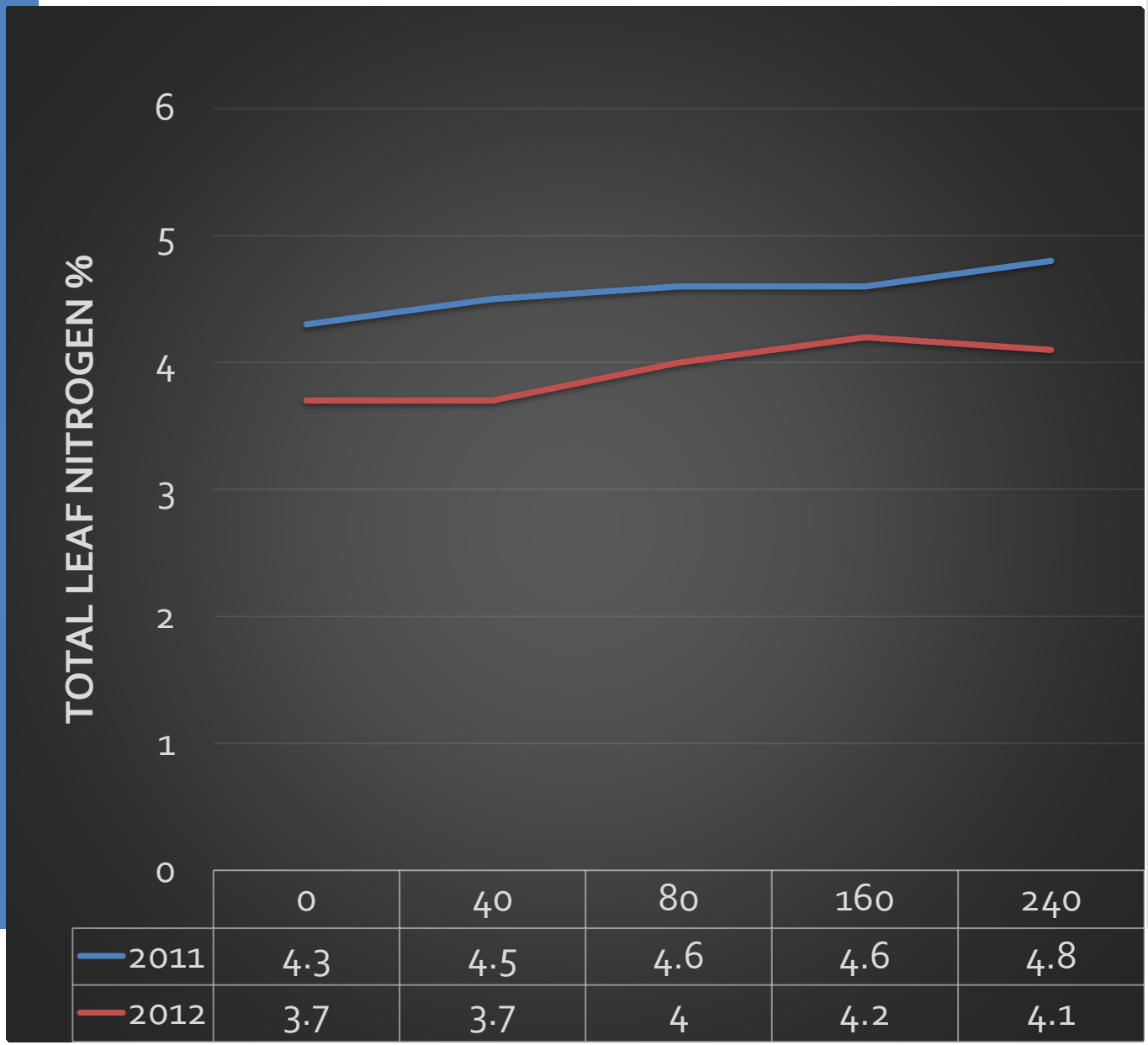


Yield Efficiency

Nitrogen Rate (lbs. N/ac)	2011	2012
0	0.07	0.04
40	0.08	0.05
80	0.11	0.03
160	0.09	0.03
240	0.12	0.04

Total Leaf N (%)

Optimal = 2.6 – 3.0%



	0	40	80	160	240
2011	4.3	4.5	4.6	4.6	4.8
2012	3.7	3.7	4	4.2	4.1

Summary

- Mature trees have a large buffering capacity
  - High initial nitrogen % in leaves
  - Separation between treatments (No vs. N_4)?
- Total leaf N (%) continues to be high
- N rate does not appear to alter bud distribution in mature trees
- Additional yield data in years without significant freeze damage important
- Effect of varying N rates on tree establishment?


No = 0 lbs N/ac/yr
N3 = 160 lbs N/ac/yr