Fertilizing Young Almond Orchards

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Fertilizing Young Almond Orchards

Fertilizing Considerations:

- What type of fertilizer to apply?
- How much should be applied?
- How much should be applied in a single application?
- What are the other concerns for young orchards?

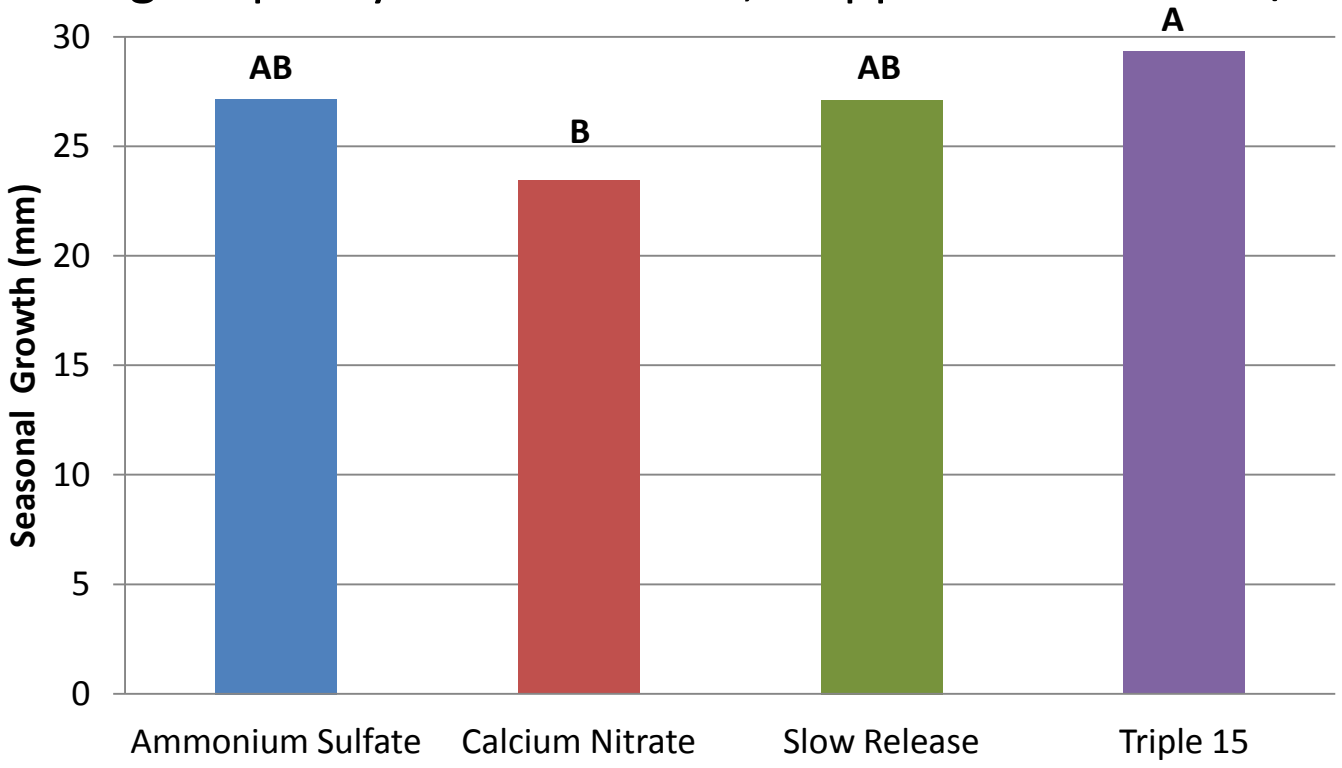
Fertilizing Young Almond Orchards – What Type?

Fertilizer Source Trials

- Two locations within Merced Co.
- Nitrogen was sourced as ammonium, nitrate, or blends
- Applied as granular multiple times through the year at the same rate (4 ozs/tree)
- Measured growth, tissue analysis

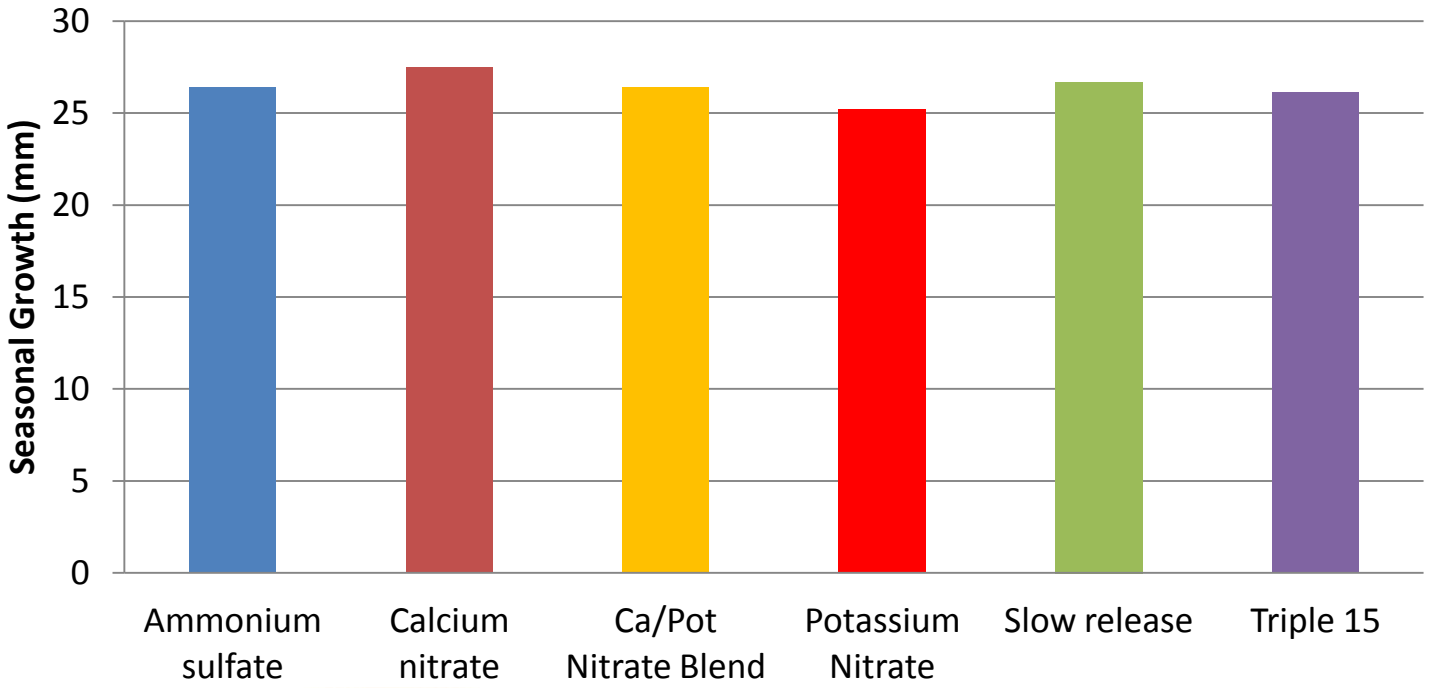
First Year Fertilizer Studies: Merced County

Loamy sand soil, irrigated with solid set sprinklers, neutral soils, low cation exchange capacity – 4 ozs total N, 6 applications of 1 oz/tree

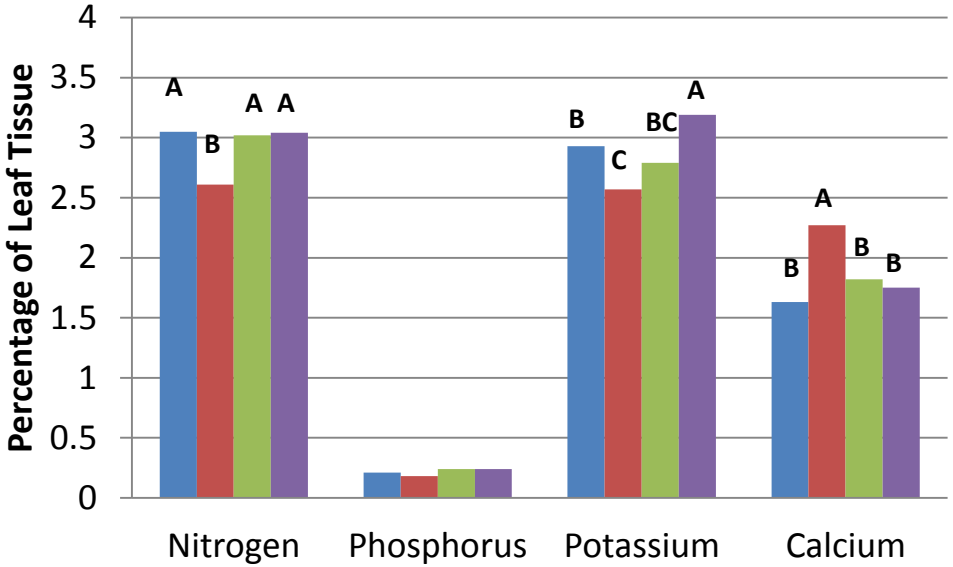


First Year Fertilizer Studies: Merced County

Sandy loam soil, irrigated with micro-sprinklers, acidic soils, medium cation exchange capacity – 4 ozs total N, 6 applications of 1 oz/tree

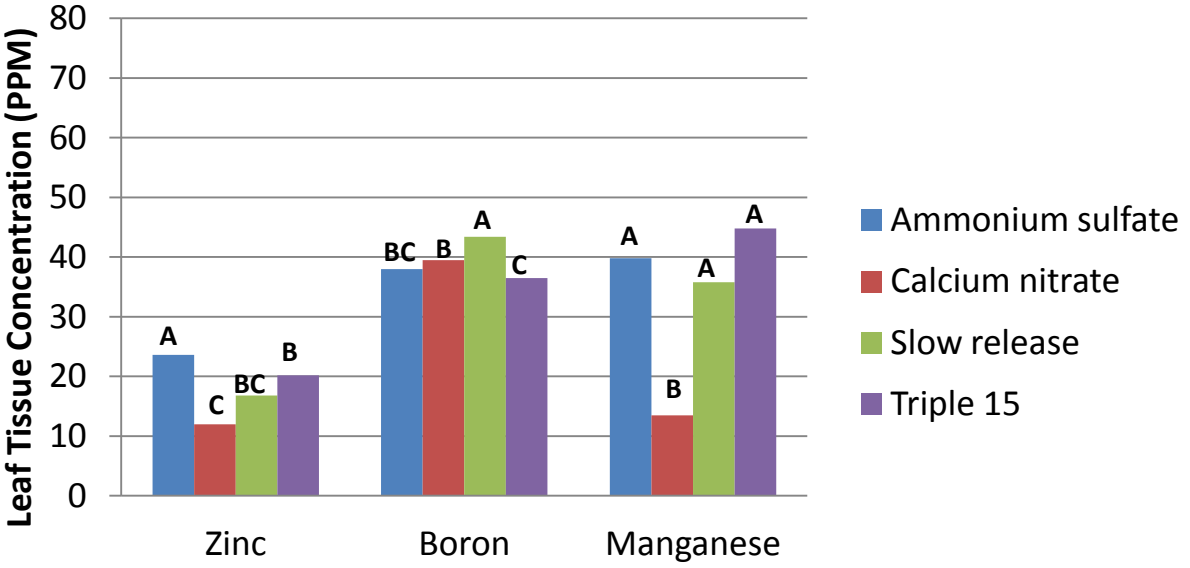


First Year Fertilizer Studies: Merced County



Major nutrients affected by fertilizer content

Treatments not connected by same letter indicate statistical difference at p>0.05



Micro nutrients affected by fertilizers – suspect changes in soil pH

Fertilizing Young Almond Orchards: What type?

Nitrogen is nitrogen

- certain fertilizers leach more rapidly

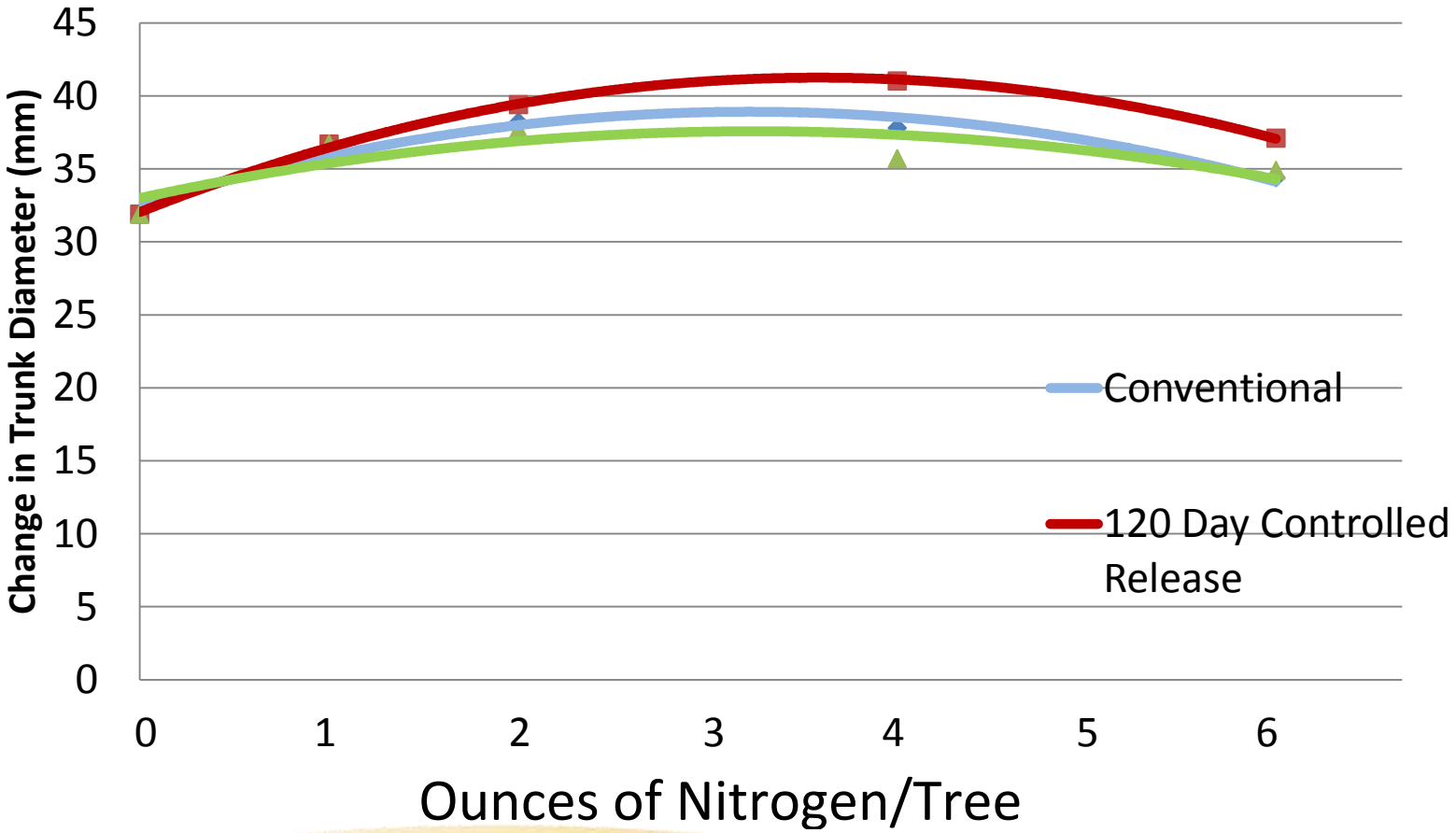
-affect soil pH, changes micronutrient availability

Fertilizing Young Almond Orchards: What Rate?

Fertilizer Rate Trials

- Sand soil
- Nitrogen was sourced using blended triple 15 granular, controlled release
- Applied at variable rates with 0, 1, 2, 4, 6 ozs of N/tree with split applications
- Tree growth and tissue (tissue not shown)

Merced Trials – First Year Almond Fertilization Rate

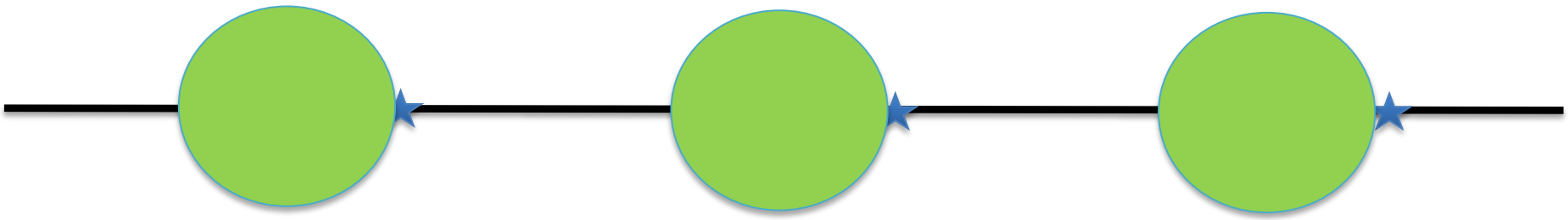


Fertilizing Young Almond Orchards: What rate?

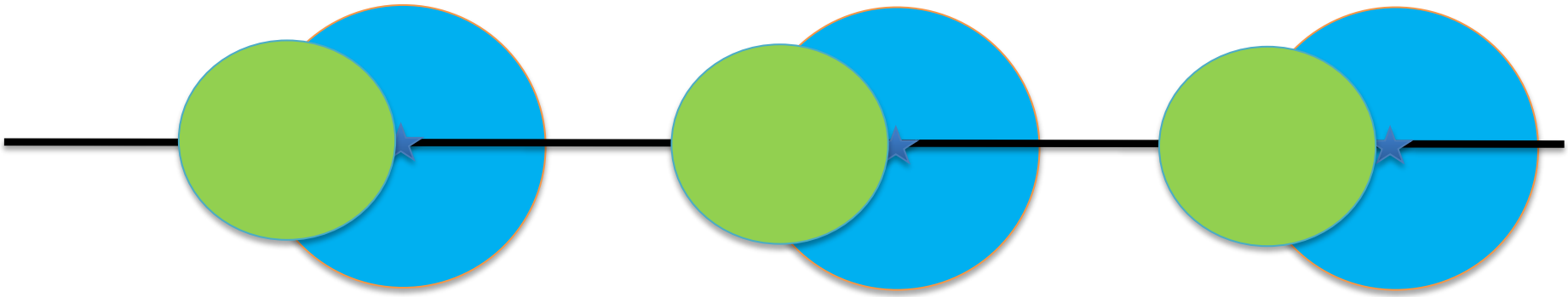
- Study suggest somewhere between 3-4 ozs of Nitrogen per tree
  - Supported earlier work of John Edstrom
  - Supports Patrick Brown's work of 20-30 lbs/acre of vegetative growth requirement

Rate/Tree	18'x22' (110)	16'x22' (123)	14'x22' (141)
3 oz	20 lbs N	23 lbs N	27 lbs N
4 oz	28 lbs N	31 lbs N	35 lbs N

Fertilizing Young Almond Orchards: Efficiency Considerations



Fertilizing Young Almond Orchards: Efficiency Considerations



Application Efficiency of systems for young trees is dependent upon delivery to development root system.

Fertilizing Young Almond Orchards: How much?

For 2nd leaf or older:

- Nitrogen needs look to be around 25-30 pounds for growth
- Needs to be added to crop requirements if yielding under 2000 lbs/acre

Fertilizing Young Almond Orchards: How much?

BE CONSERVATIVE: Many little feeds are better than one “slug.”

No More than one oz of N per tree’s age for any application

1 year old: one oz of N per fertilization

2 year old: two ozs of N per fertilization

WHY?

Fertilizing Young Almond Orchards: How much?

Lanky Growth

Nitrogen Burn

Fertilizing Young Almond Orchards: Other Considerations?

Fertilizing Young Almond Orchards: Other Considerations?

Nitrate-nitrogen (NO^3-N) in the soil:

$$N\ (lbs/acre) = \frac{NO^3\text{-}N\ concentration\ (ppm) * 2 * soil\ sample\ thickness\ (in.)}{6\ inches}$$

Depth	5 PPM	10PPM	15 PPM	20 PPM
0-6”	10	20	30	40
0-12”	20	40	60	80

Fertilizing Young Almond Orchards: Other Considerations?

Nitrate-nitrogen (NO^3-N) in the water:

N (lbs/acre inch) = NO^3-N concentration (ppm) *0.23

Acre inches applied	3 PPM	5 PPM	10 PPM	15 PPM
1	0.7	1.15	2.3	3.45
6	4.1	6.9	13.8	20.7
12	8.3	13.8	27.6	41.4
24	16.6	27.6	55.6	82.8

Fertilizing Young Almond Orchards: Other Considerations?

- **Urea** – produced through Haber-Bosch process, must be converted to nitrate, can volatilize, water soluble, stable (~46% N)
- **Ammonium (NH_4^+)** – Can be used by plants in anaerobic conditions, positively charged in neutral, acidic soils
  - Ammonium Sulfate
- **Nitrate (NO_3^-)** – Plant available form of nitrogen, negatively charged, easily leached
  - Calcium Nitrate
  - Potassium Nitrate
- **N-pHURIC**– Source of acid for acidification of soils (high pH) and nitrogen
- Blends:
  - Urea Ammonium Nitrate (UN-32) – liquid blend
  - Calcium Ammonium Nitrate (CAN-17) – liquid blend

Fertilizing Young Almond Orchards: Other Considerations?

When to start:

- Wait until at least 6-12 inches of new growth
- Hold off irrigation until soil begins to dry down