Comparison of Potassium Sources and Rates for Tomato Production in Florida

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Essential Plant Nutrients

- Potassium (K) is one of the two most-absorbed nutrients for tomato production.
- Essential: Osmotic potential and fruit quality.

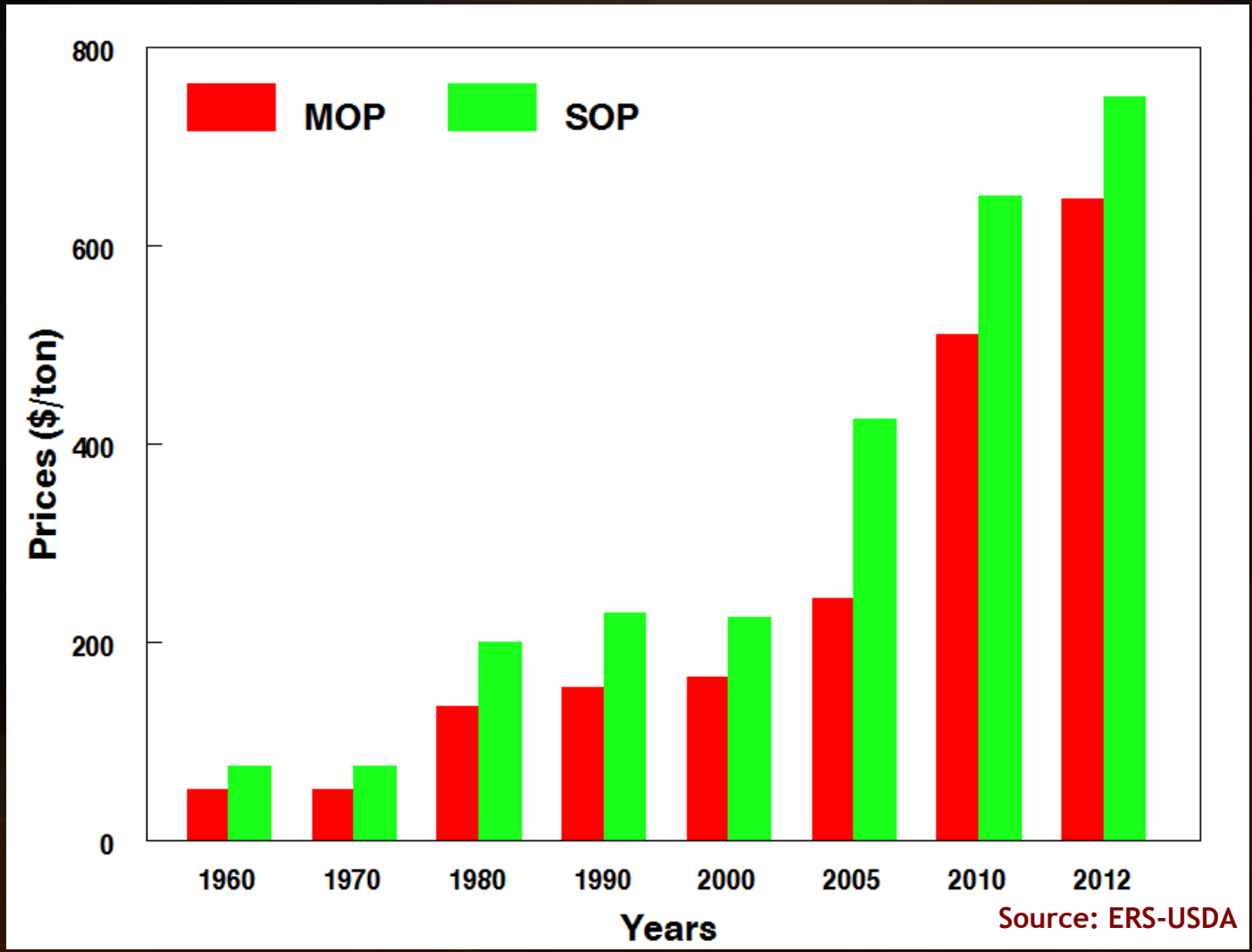
Determination of K Rates

Application rate

Sources

- Preplant:
  - Sulfate of potash (SOP; 0-0-50 + 17S).
  - Muriate of potash (MOP; 0-0-60).
  - Potassium nitrate (13-0-45).
- Drip:
  - Potassium nitrate.
  - Potassium thiosulfate.

Historical K Fertilizer Prices



Rates

- No longer “cheap insurance”.
- 400 to 500 lb/acre (2006).
  - $70 to 85/acre (2006).
  - $120 to 145/acre (2010).
- 275 to 350 lb/acre (2010).
  - $100 to 125/acre (2012).

Dry Fertilizer Placement

- Seepage irrigation:
  - "Cold mix": Bottom of the bed.
    - 25% to 35% of K rate.
  - "Hot mix": 1 or 2 bands.
    - 65% to 75% of K rate.

Current Situation

- Many tomato growers not transitioning to drip irrigation.
- Cheaper fertilizer blends are desirable.
- Growers were afraid of using MOP due to its high salt index.
  - Salt index: SOP – 46; MOP -116.
  - Rate dependent!


High Salt Injury

Objective

Comparing tomato growth and yields using different K sources and rates.

Materials and Methods

- Two field trials:
  - Gulf Coast REC.
  - 2009 and 2010.
  - Spodosol, pH 6.7-7.0 and OM of 1.2%.

Materials and Methods

- K sources and rates:
  - SOP and MOP.
  - 0, 50, 100, 200, 300, 400 and 500 lb/acre.
  - Preplant: Two bands, 2 inches deep.
  - No other preplant or drip K application.
  - 4 weeks before transplanting.
  - S balanced with elemental S.
  - Irrigation: Seepage.

Materials and Methods

- Variables:
  - Two harvests: 10 and 12 WAT.
  - Fruit grading: XL and total marketable.
  - K foliar concentrations: 4 and 8 WAT.
  - Plant height: 4 and 8 WAT.
  - Soil EC: 4 WAT.
  - RCB design with 2 factors; 6 reps.
  - Regression and standard errors.

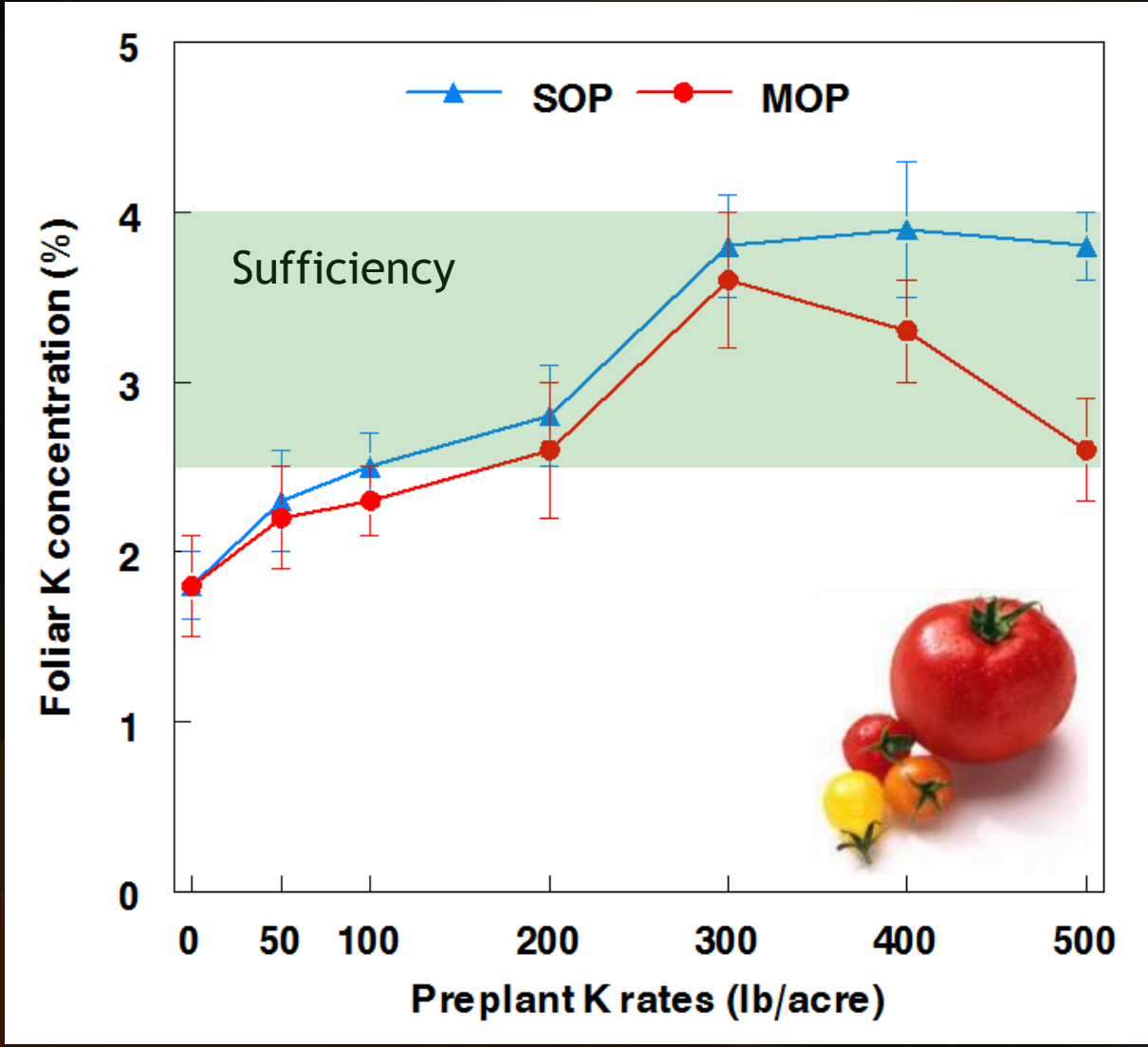
K Sources and Rates: Plant Height

100 lb/acre

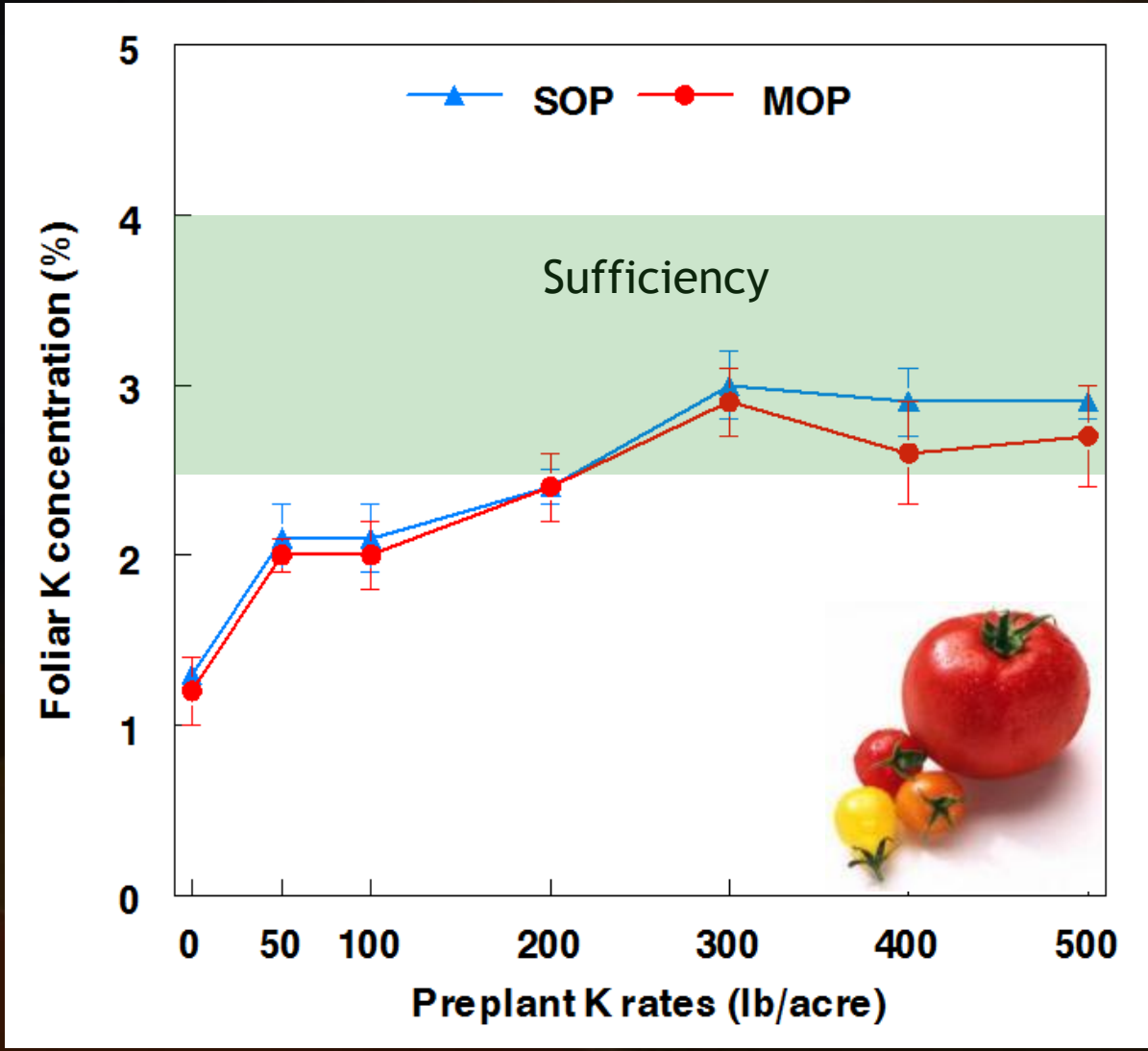
200 lb/acre

300 lb/acre

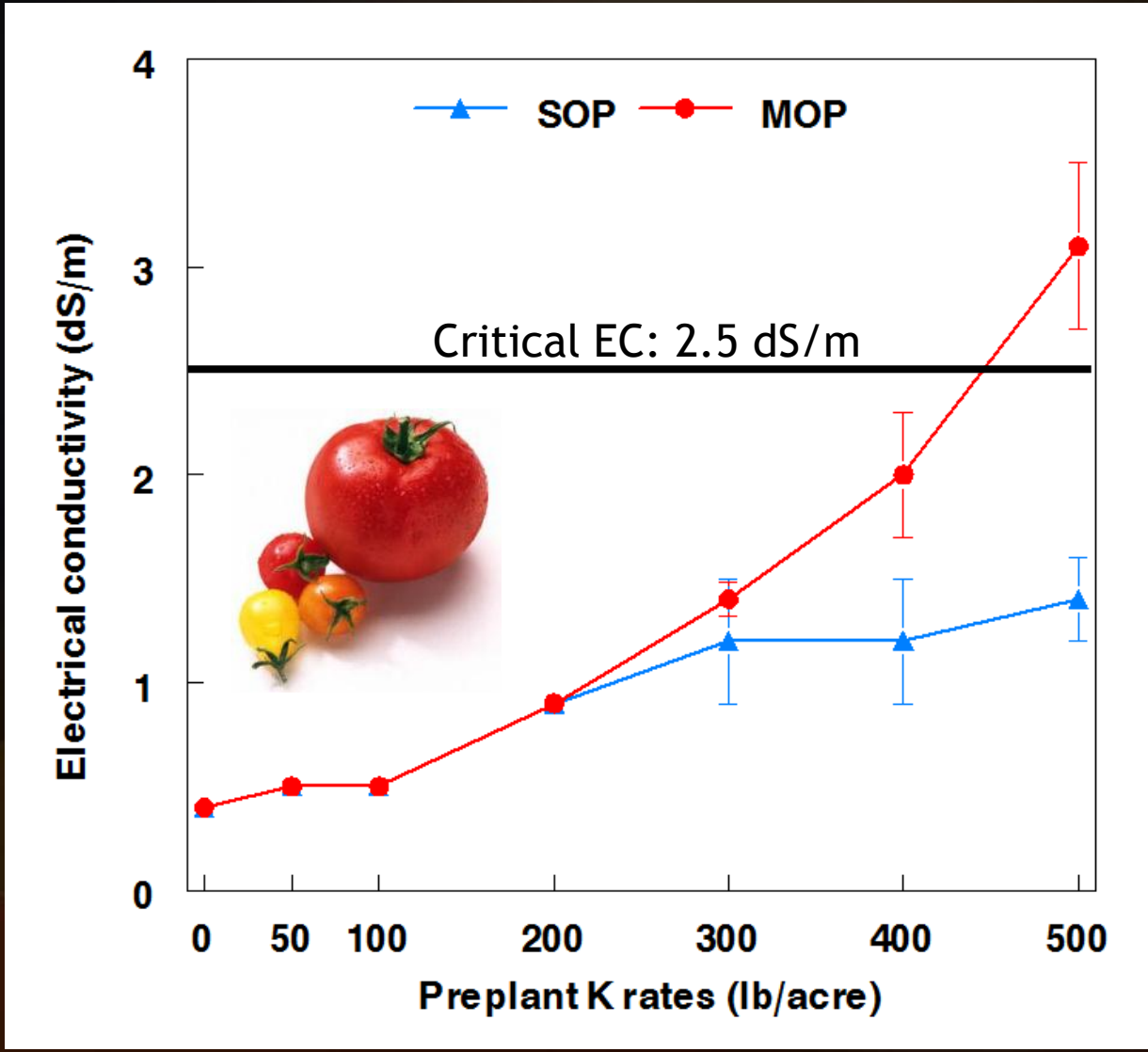
K Sources and Rates: K Conc. (4 WAT)



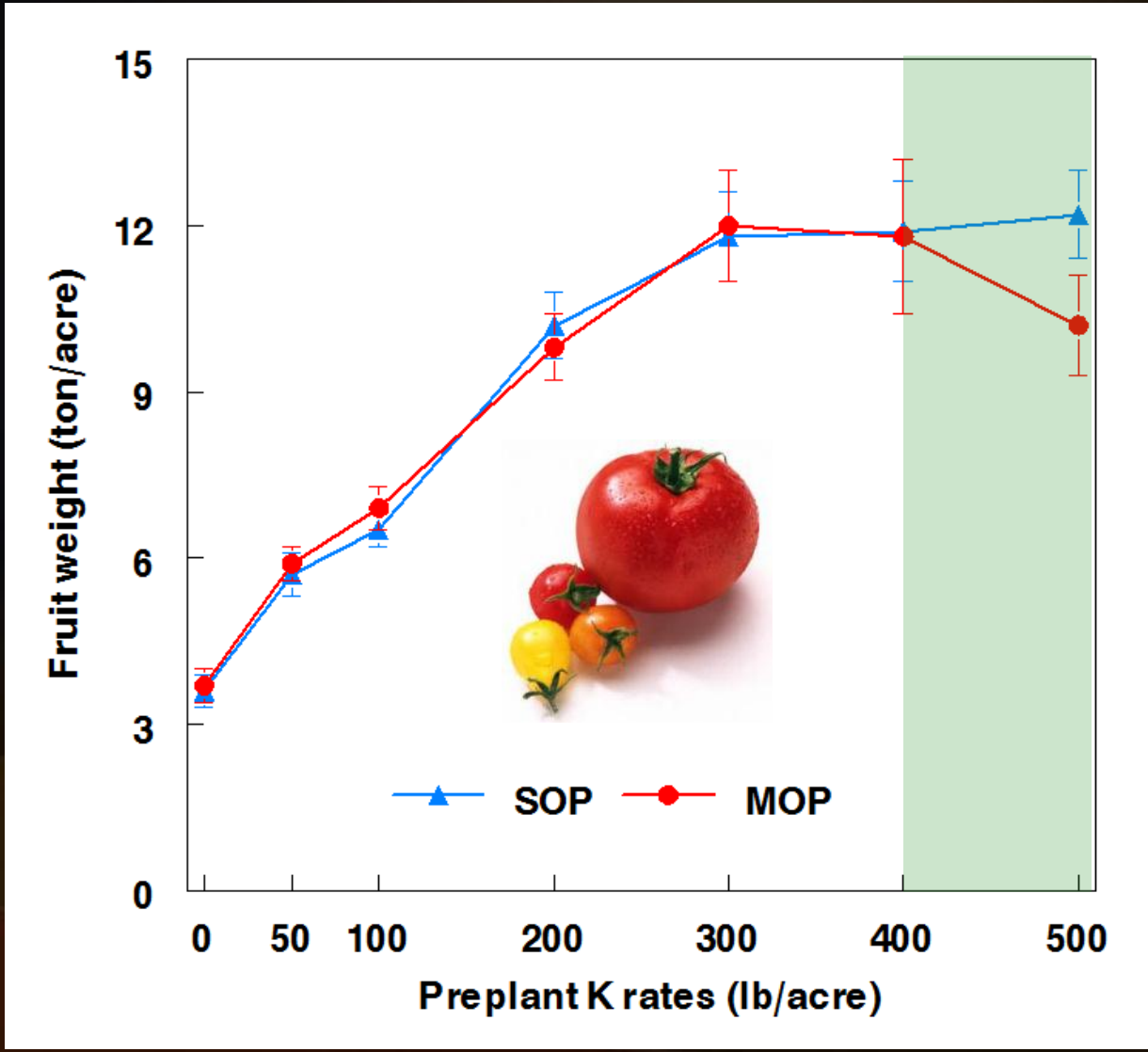
K Sources and Rates: K Conc. (8 WAT)



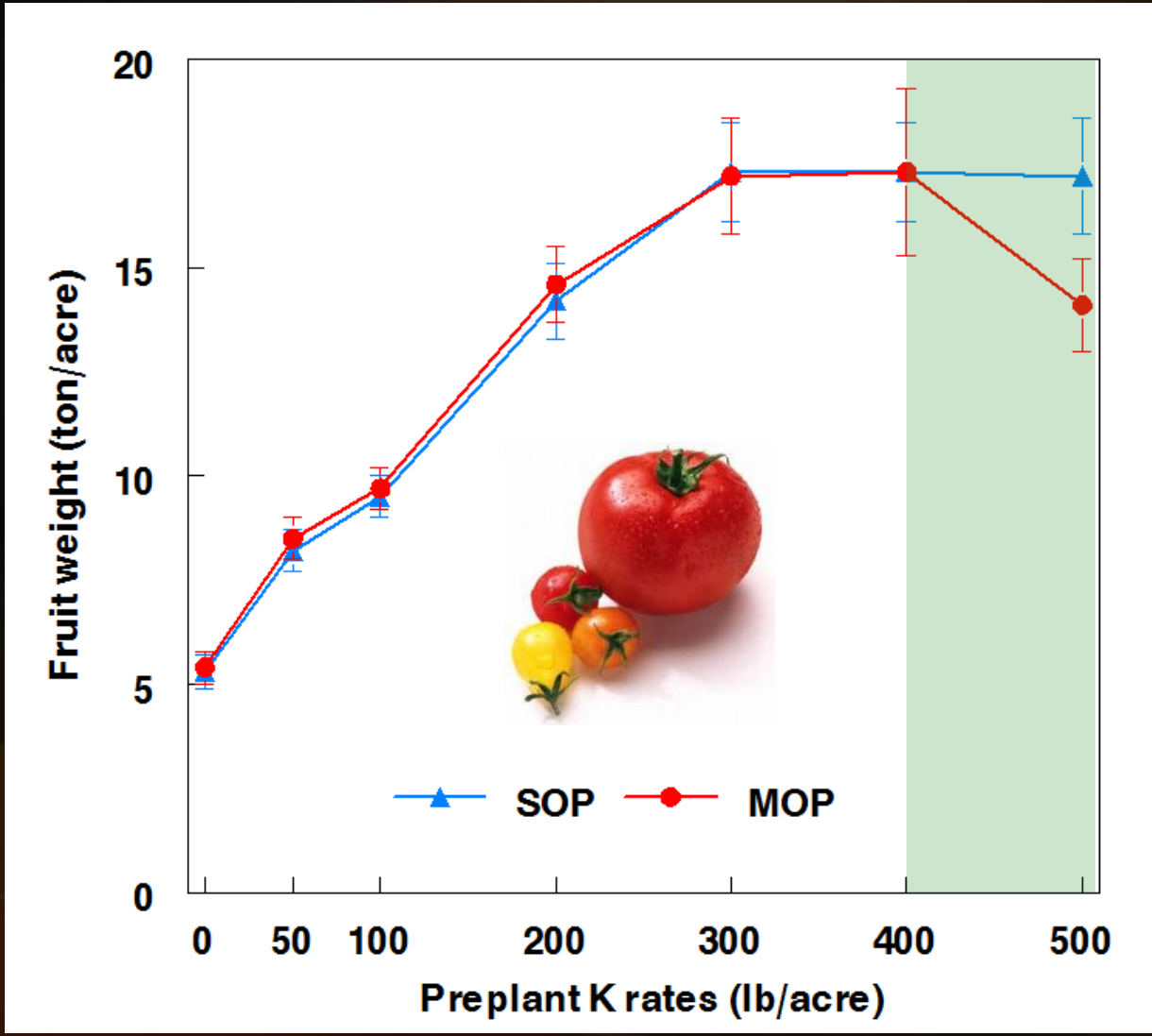
K Sources and Rates: EC (4 WAT)



K Sources and Rates: Total XL Yield



K Sources and Rates: Total Marketable Yield



Summary

- Differences on tomato performance due to:
  - K rates and sources.
  - SOP: No injury up to 500 lb/acre of K.
  - MOP: Same as SOP up to 400 lb/acre of K.
  - EC (salt injury): Higher than 400 lb/acre of K.
  - MOP could replace a proportion of SOP in preplant formulas to lower fertilizer costs.

- "Coming attractions":
  - What about drip K fertilization?


Thanks! Questions?
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http://gcrec.ifas.ufl.edu/SantosHortProgram/index.htm