

Field Evaluations of Liquid Organic Fertilizers on Strawberries

Mark Gaskell
Farm Advisor – Santa Maria

UC

University of
California

CE

Cooperative
Extension

Overview – in-season organic fertilization

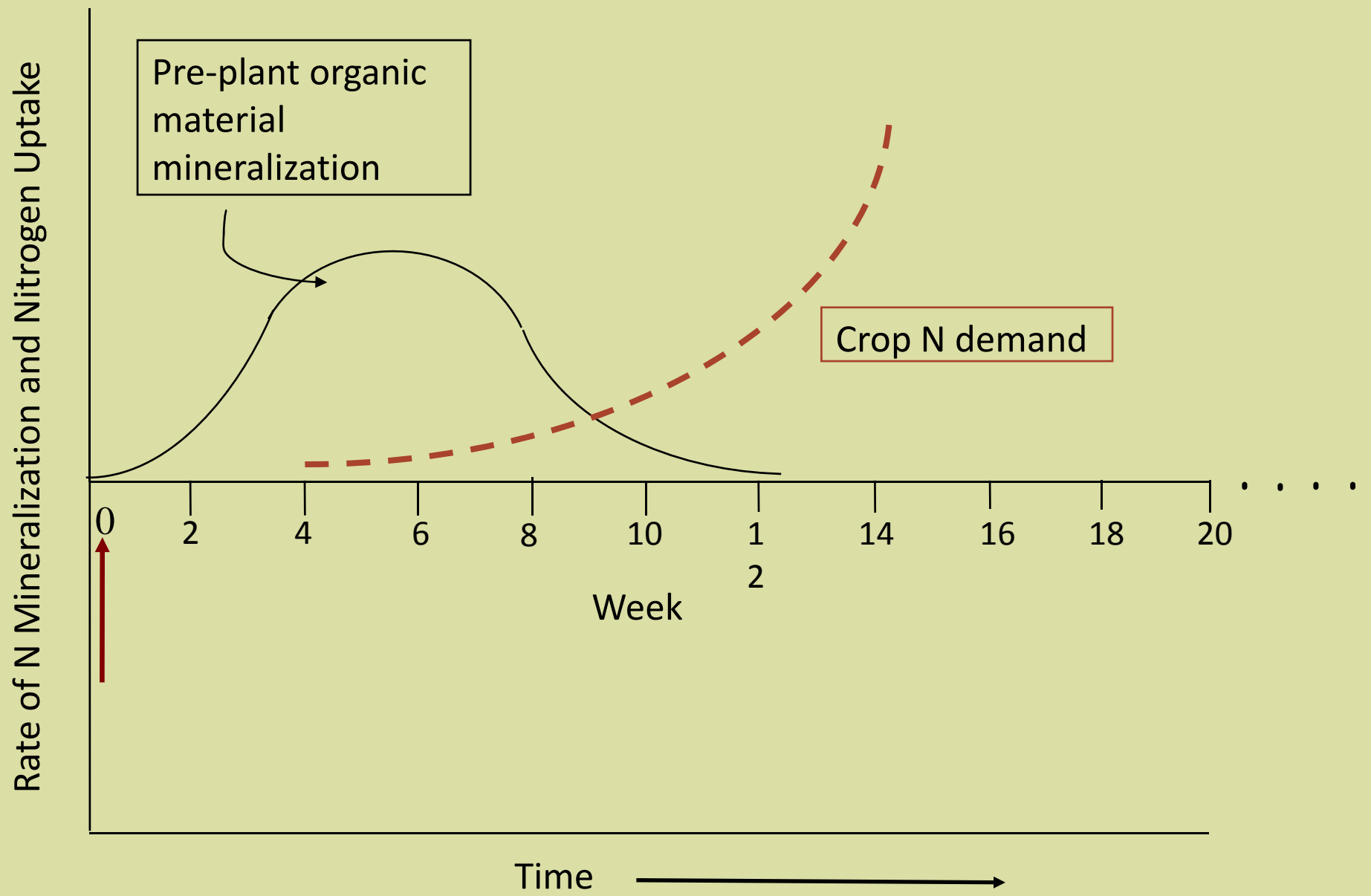
- *Need efficient fertilization practices*
 - *materials uncertain, changing*
 - *lack solubility*
- *Need mineralization for plant uptake*
 - *biological process*
- *Commercial organic N fertilizers*
 - *dry bulk, + pelleted*
 - *liquid*

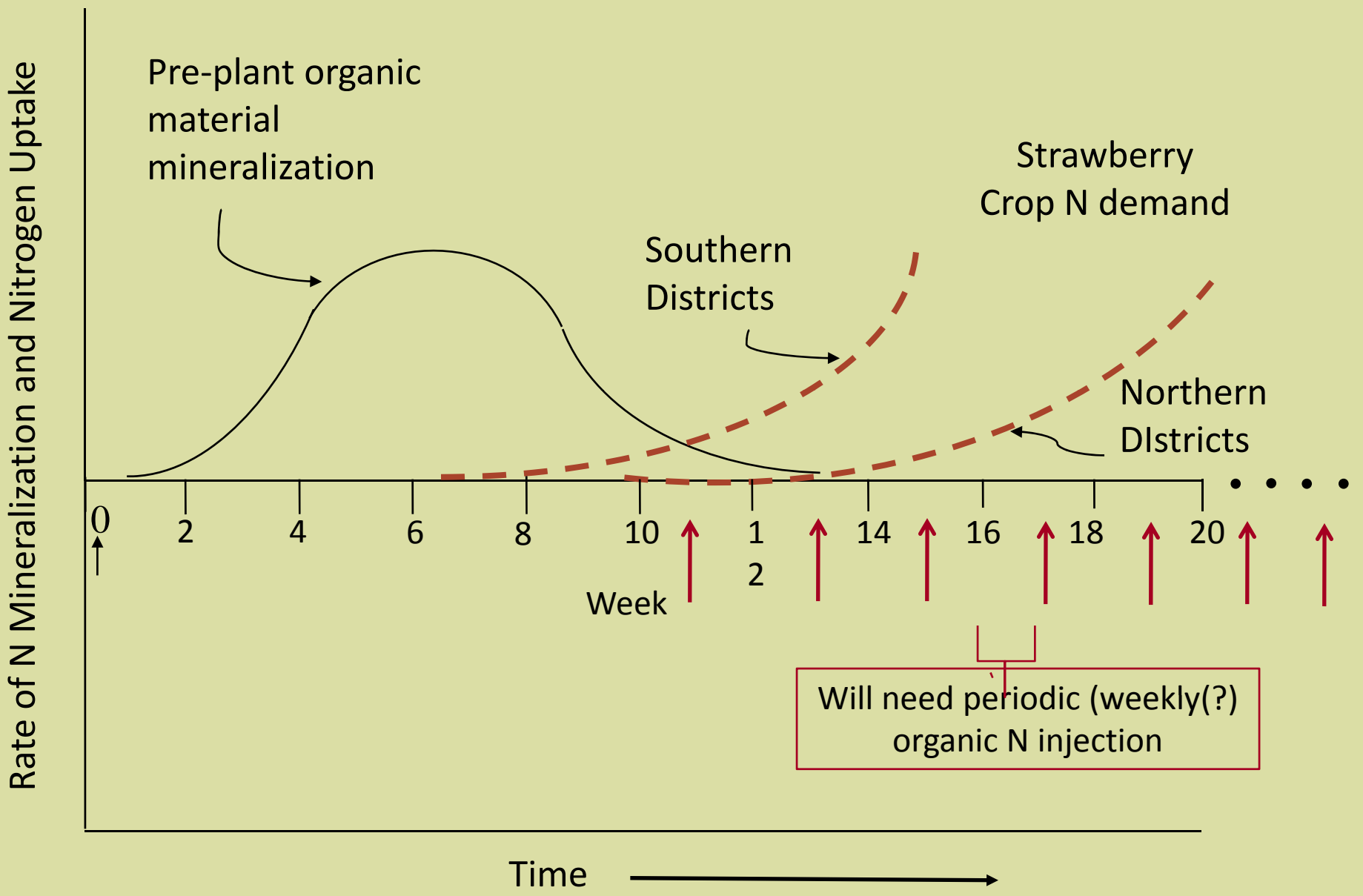
Concentrate on Nitrogen

- *Nitrogen is often most critical limiting factor*
- *Nitrogen status is shifting*
- *Phosphorus, potassium less problematic*
 - *composts, powdered, granular, liquid, etc*
 - *tend to accumulate in soils*
 - *can apply preplant incorporated – use economical materials, manage long term*
- *Preplant N gone after 6-8 weeks*

N availability from organic fertilizers related to characteristics that affect mineralization

- *Portion of material is ammonium, amino acid fragments - rapidly transformed to ammonium*
 - *relatively rapid mineralization and N availability*
 - *temperature?*
- *Chilean nitrate is special case*
- *Particulates collect in system even when finely ground and pre-sieved*
 - *growers bypass filtration*
 - *losses of material?*
 - *losses in irrigation distribution uniformity*
- *Hidden losses likely throughout the system*



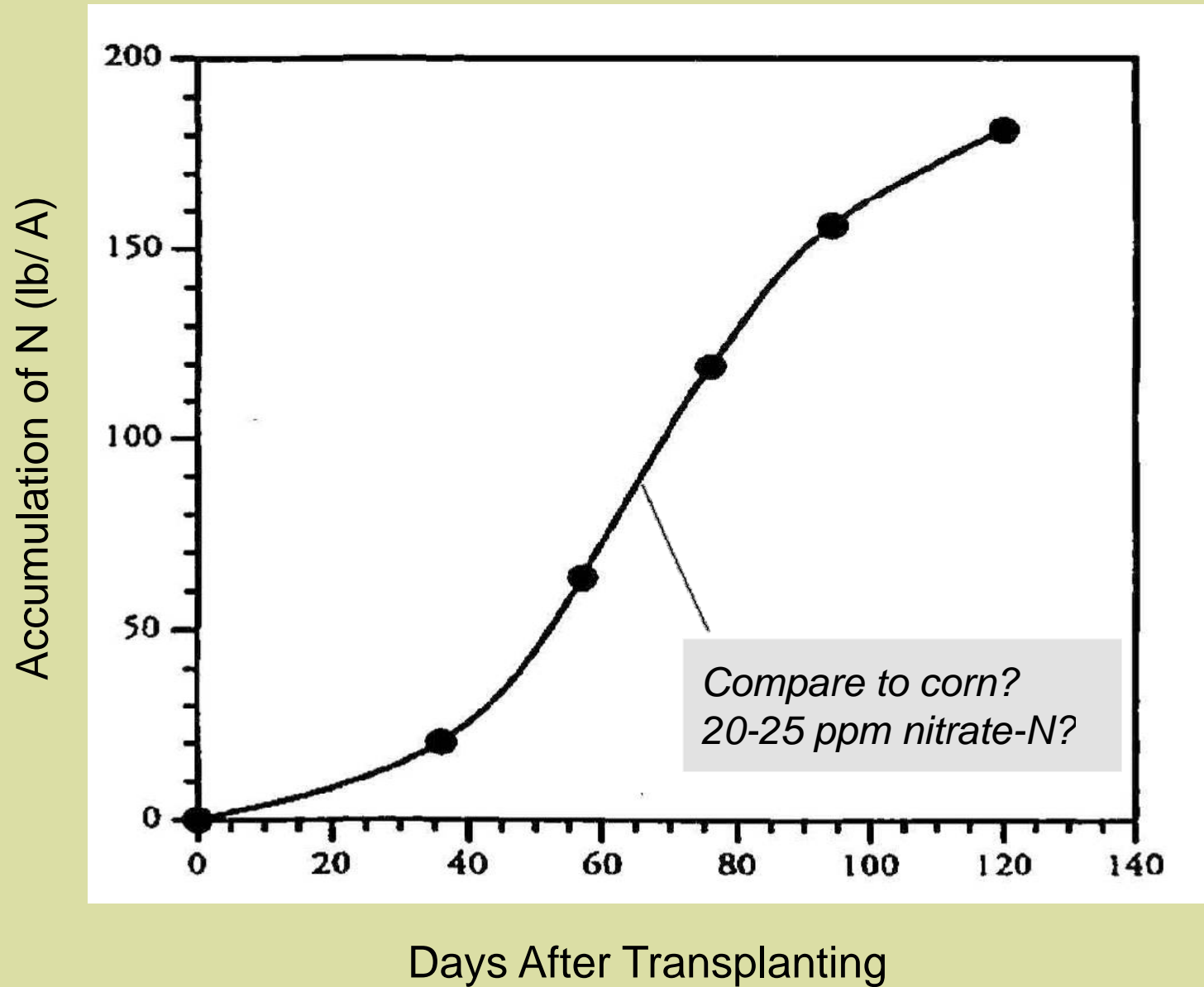


Crop	Yield	Max. dry matter accumulation (ton / A)	Maximum N accumulation lb N / acre	Phase II Growth Period	Max. N Uptake lb N / A / day
Broccoli	8 ton fresh	3.5	190	40 - 90 days	5 - 7
Corn (grain)	190 bu	12	275	45 - 65 days	4 - 7
Celery	30 ton fresh	5	240	50 - 90 days	5
Strawberry	5500 trays	3	150	170 days	< 1

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- not 100% efficient
- leaching losses and EC mgmt

Seasonal Nitrogen Accumulation for Celery



Match N availability to crop need- Organic strawberries

- *Transplanted strawberry N uptake about 4 lb N/acre - first 90 days.*
- *During the next 20 weeks of growth, N uptake approaches 70 to 90 percent of seasonal total ~ 130-150 lb N/acre*
- *N uptake is steady and continuous for the entire period*
- *Current strawberry fertigation recs for FL = 0.3 lb – 0.75 lb N /acre/day*

Slide 10

MG2

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Mark Gaskell, 12/25/2008



OMRI
Listed



GUARANTEED ANALYSIS

Total Nitrogen [N]..... 6.00 %

MANURE
FREE

4.00 % Ammoniacal Nitrogen

1.60 % Water Soluble Organic Nitrogen

0.40 % Water Insoluble Organic Nitrogen

Available Phosphoric Acid ($P_2 O_5$)..... 2.00 %

Soluble Potash ($K_2 O$)..... 0.00 %

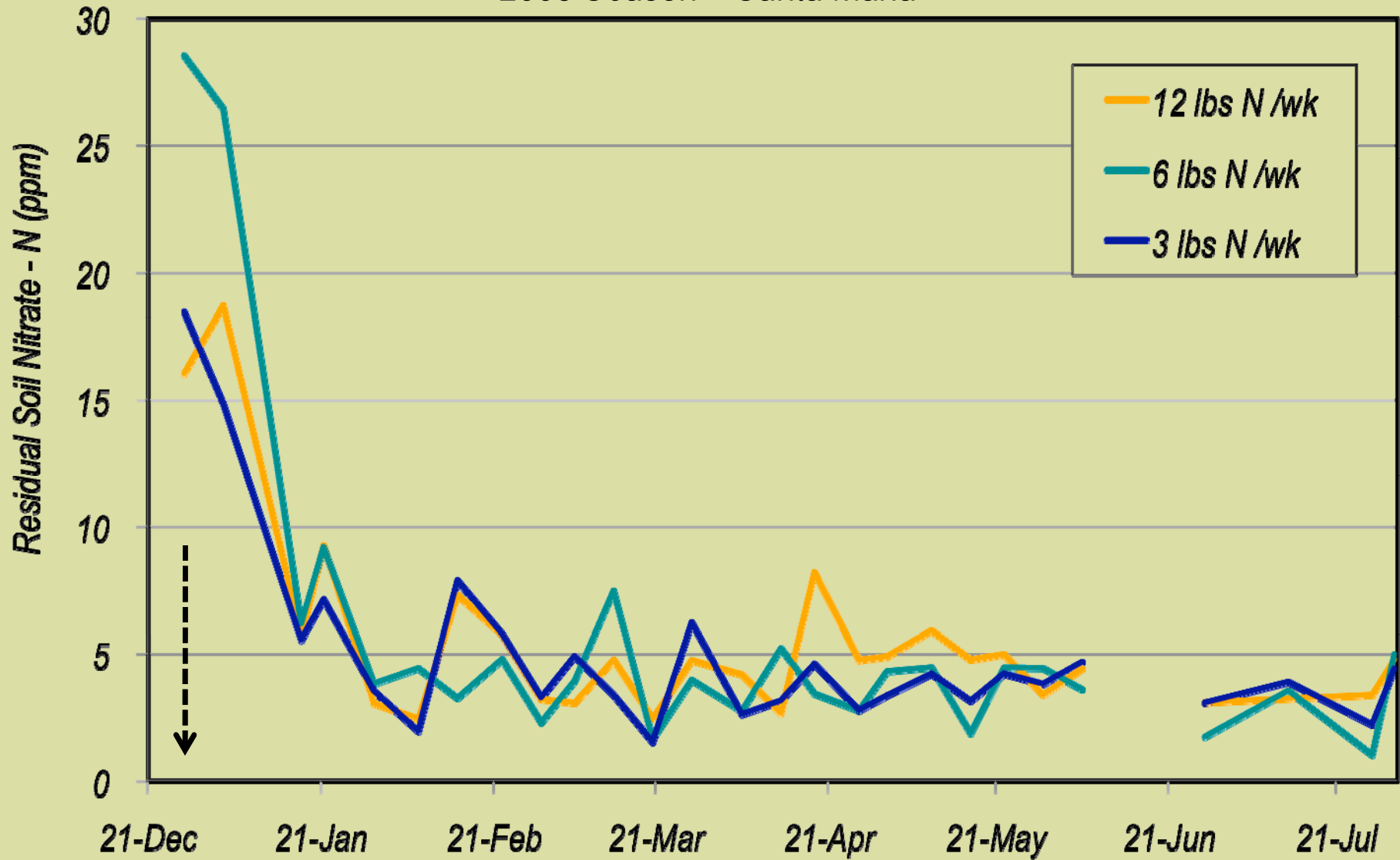
Liquid Fertilizer Derived From: meal from ocean going fish, naturally enzymatically digested, then stabilized with sulfuric acid.

PRODUCT INFORMATION

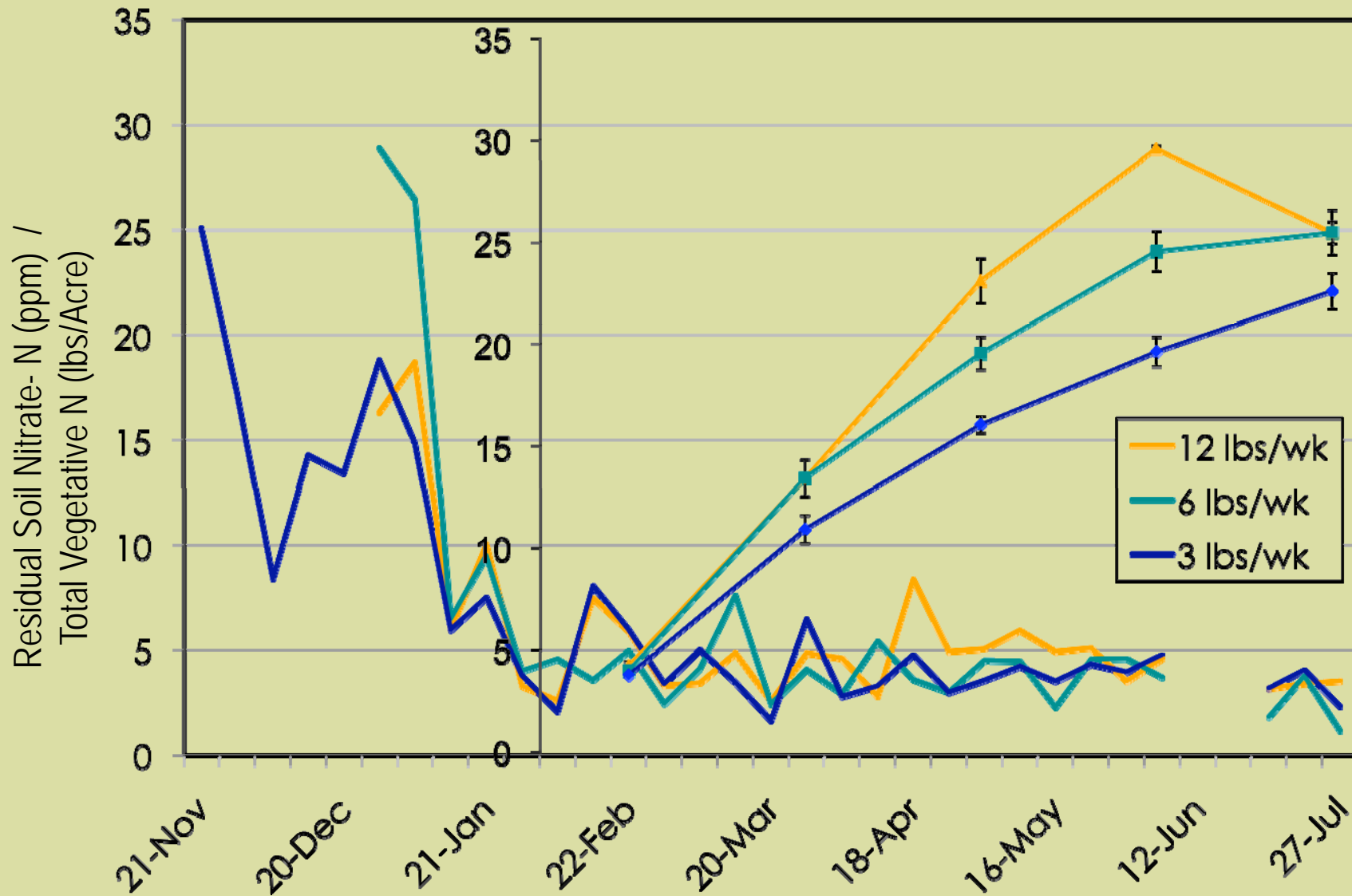
This product is sold as a commercial liquid fertilizer, designed to provide growers with a easy-to-apply fish-based nutrients for either foliar or soil fertility use. This product complies with OMRI Organic Certification standards and it can be used by Certified Organic Growers.

DIRECTION FOR USE

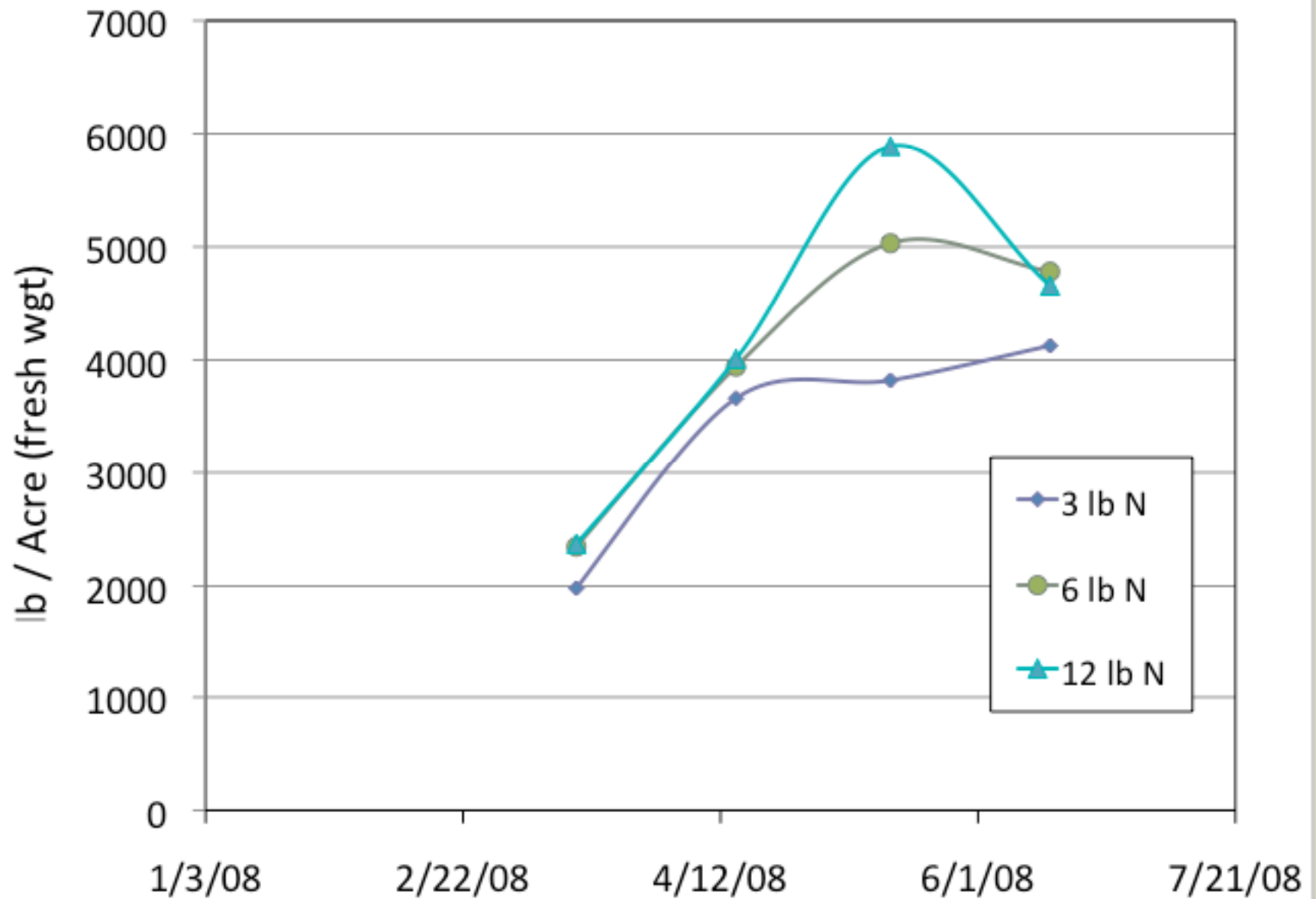
*Weekly residual soil nitrate-N at varying
weekly organic N fertigation rates
2008 Season – Santa Maria*



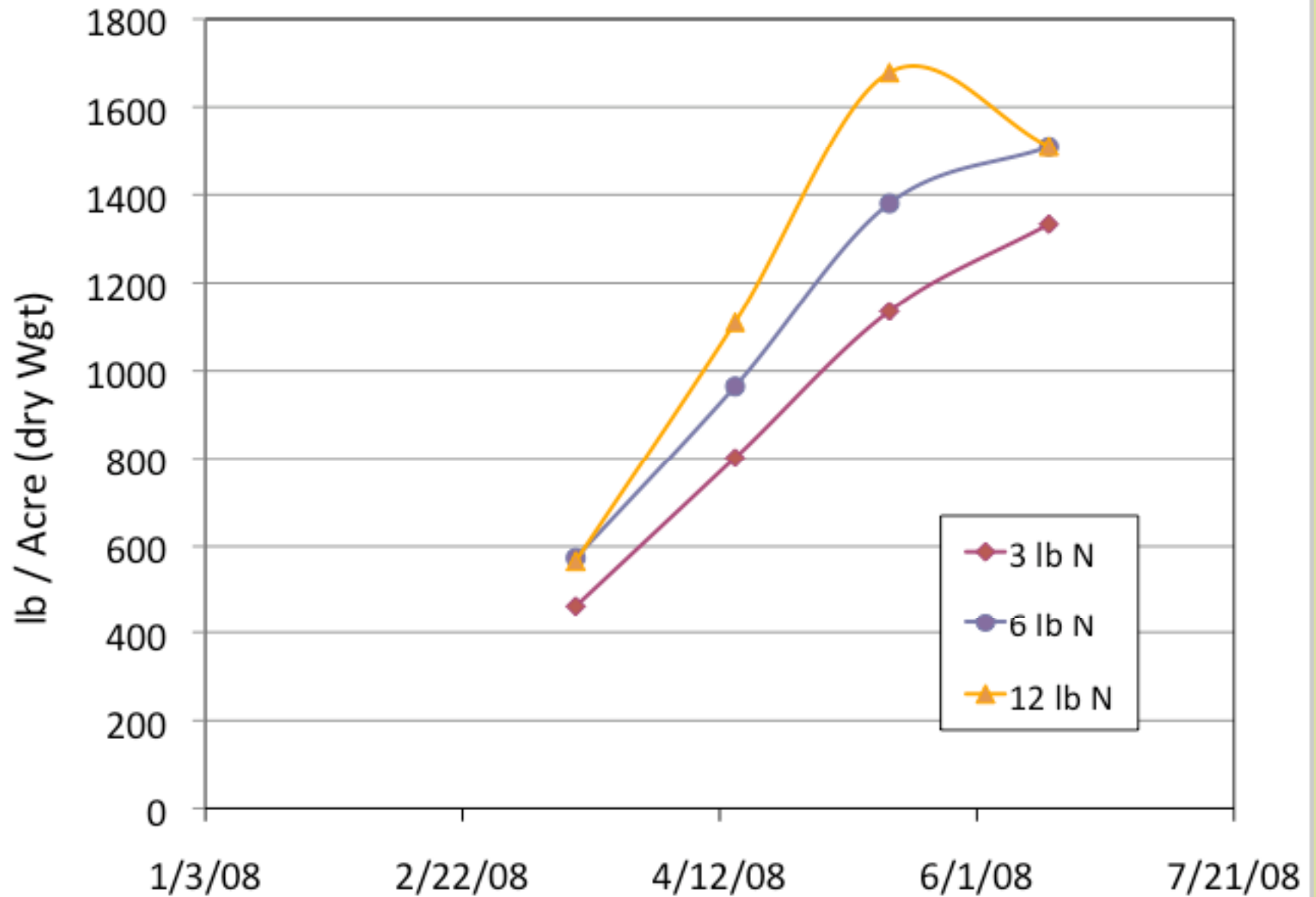
*Total Strawberry Vegetative N & Residual Soil Nitrate- N
at Different Weekly Organic N Fertilization Rates
Manzanita Ranch -Santa Maria, 2008*



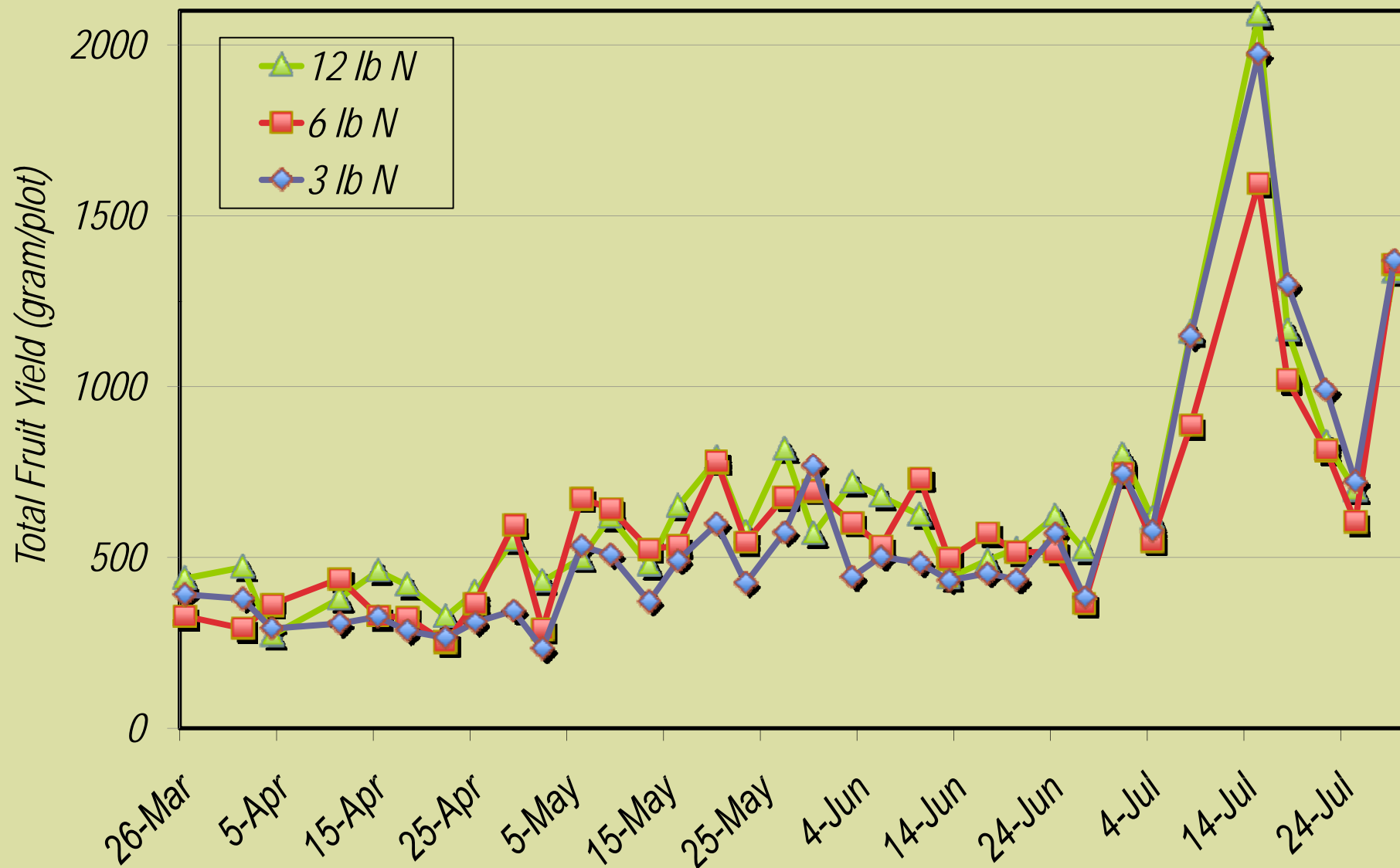
Accumulation of strawberry plant fresh weight at varying rates of weekly organic N fertigation



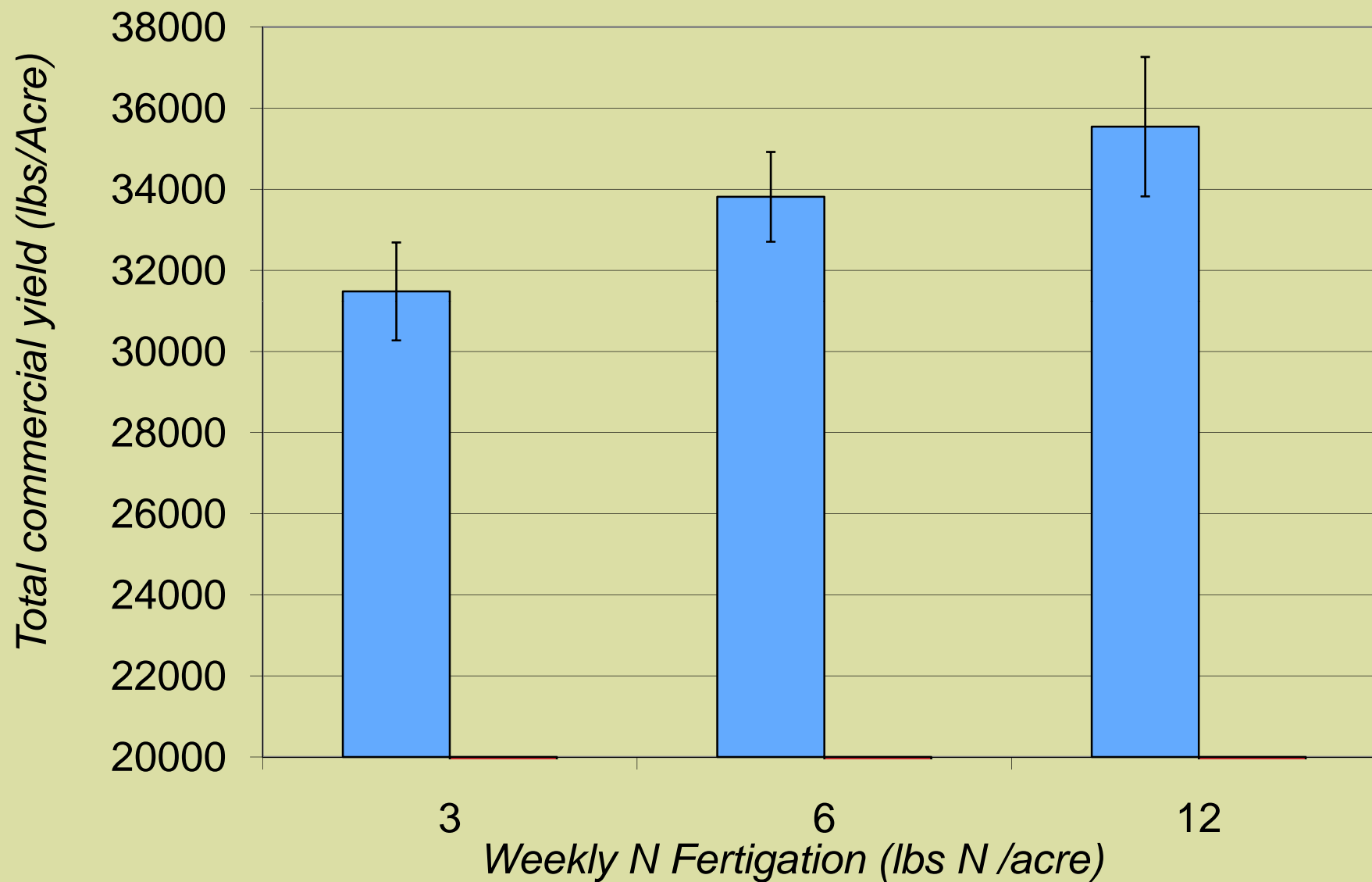
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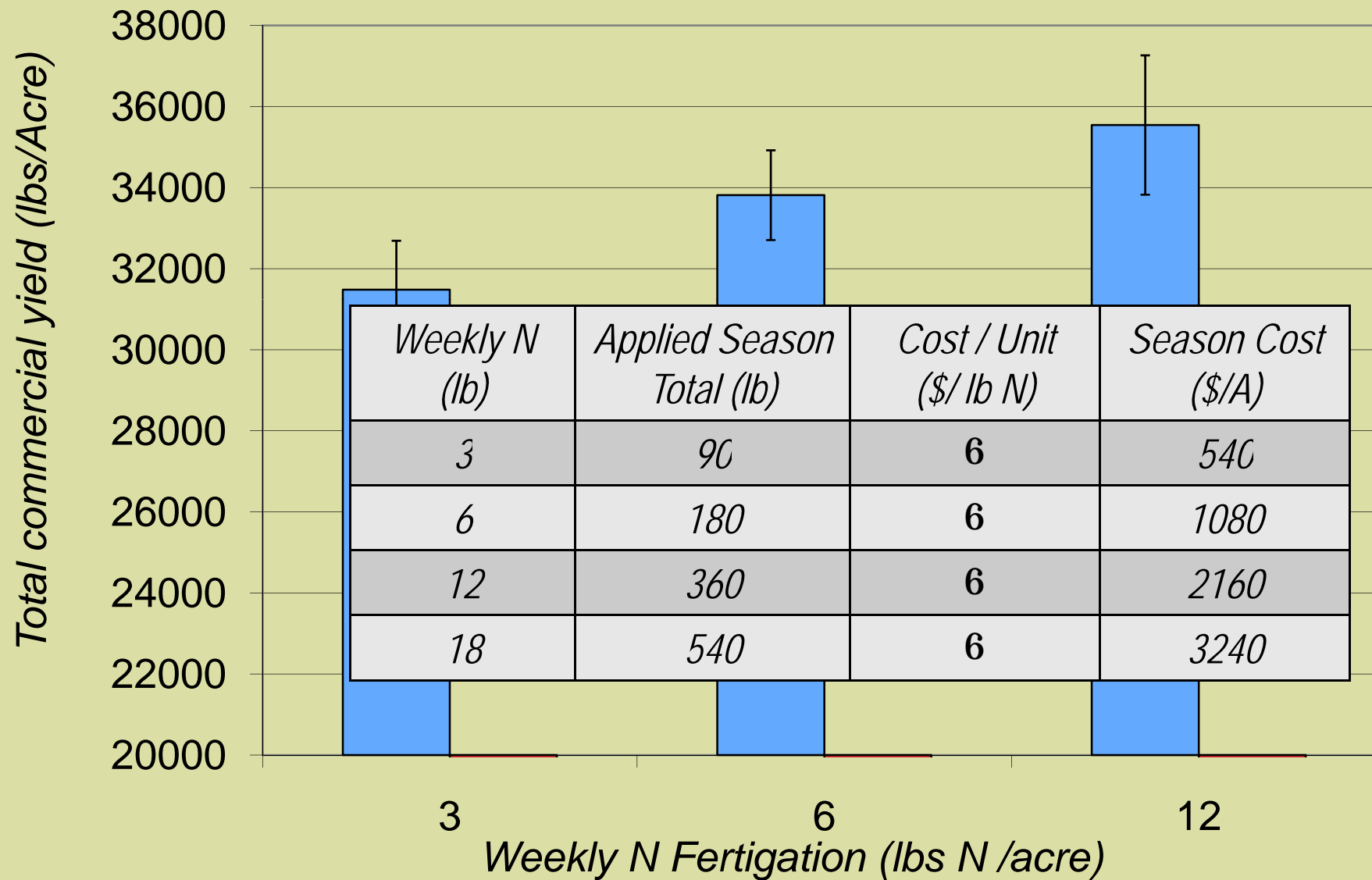
*Weekly strawberry production from plots receiving varying rates of weekly organic N fertigation
Santa Maria, CA – 2008 Season*



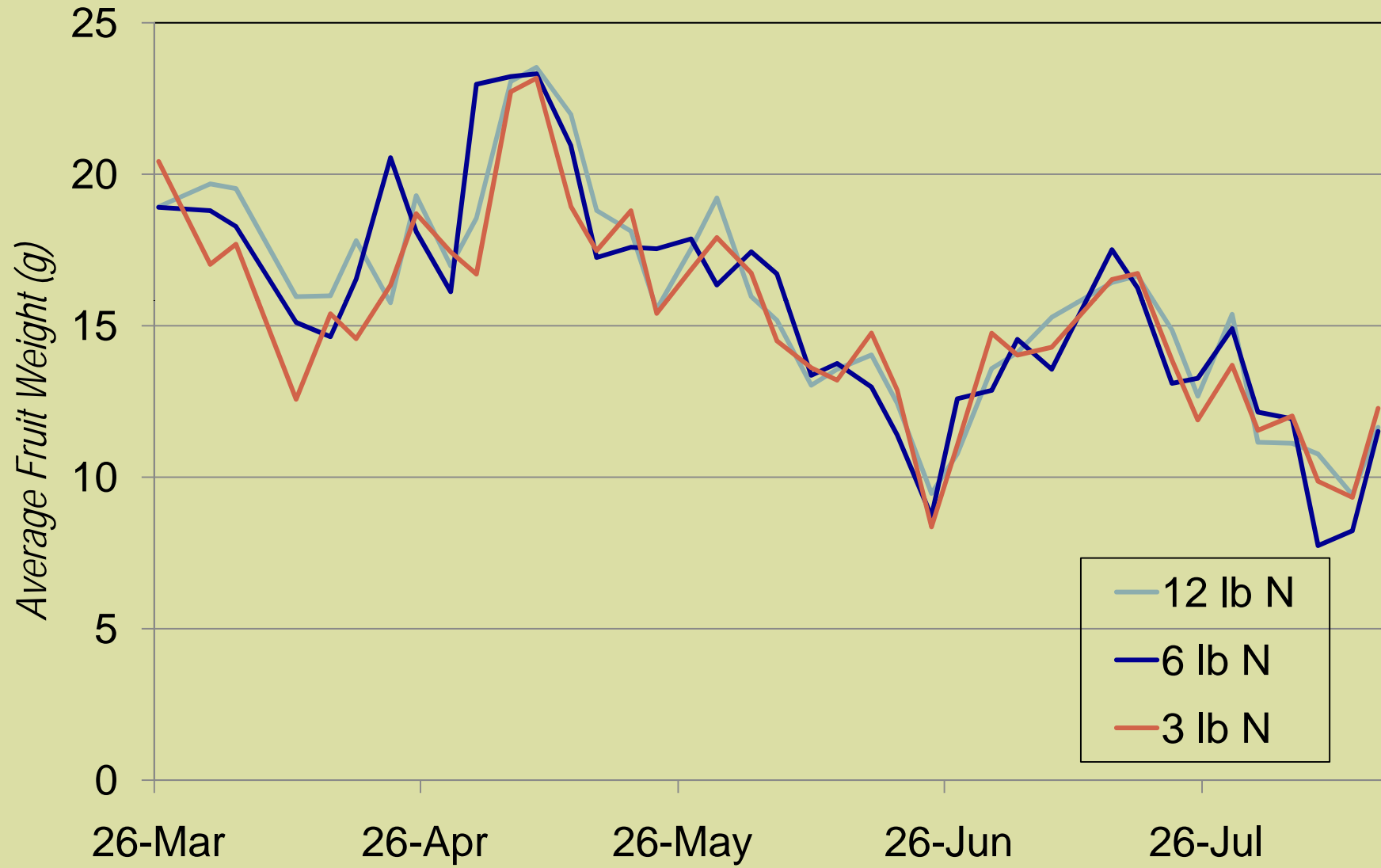
*Organic strawberry total fruit yield in plots receiving varying rates of organic N fertigation
Santa Maria, CA – 2008 Season*



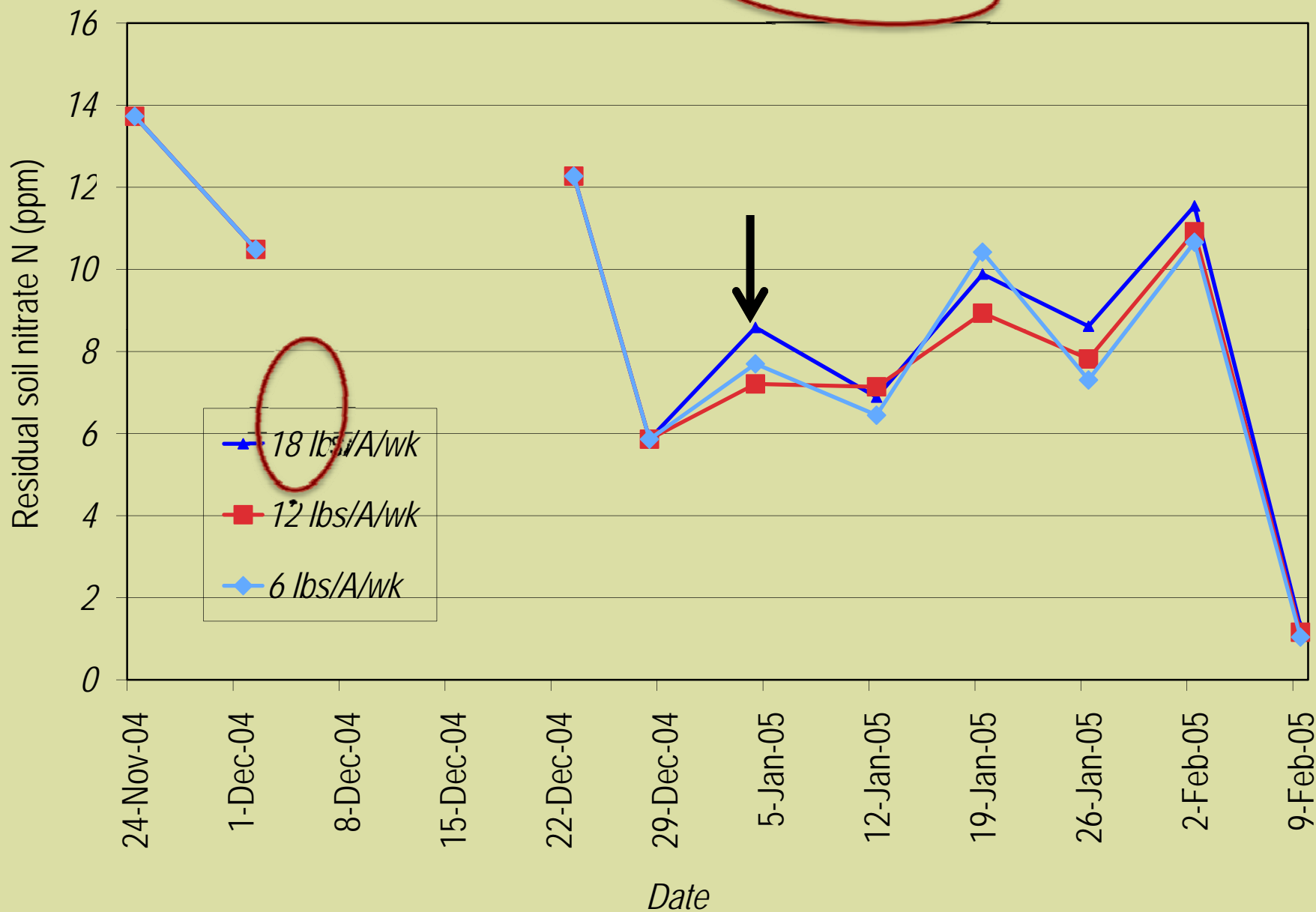
*Organic strawberry total fruit yield in plots receiving varying rates of organic N fertigation
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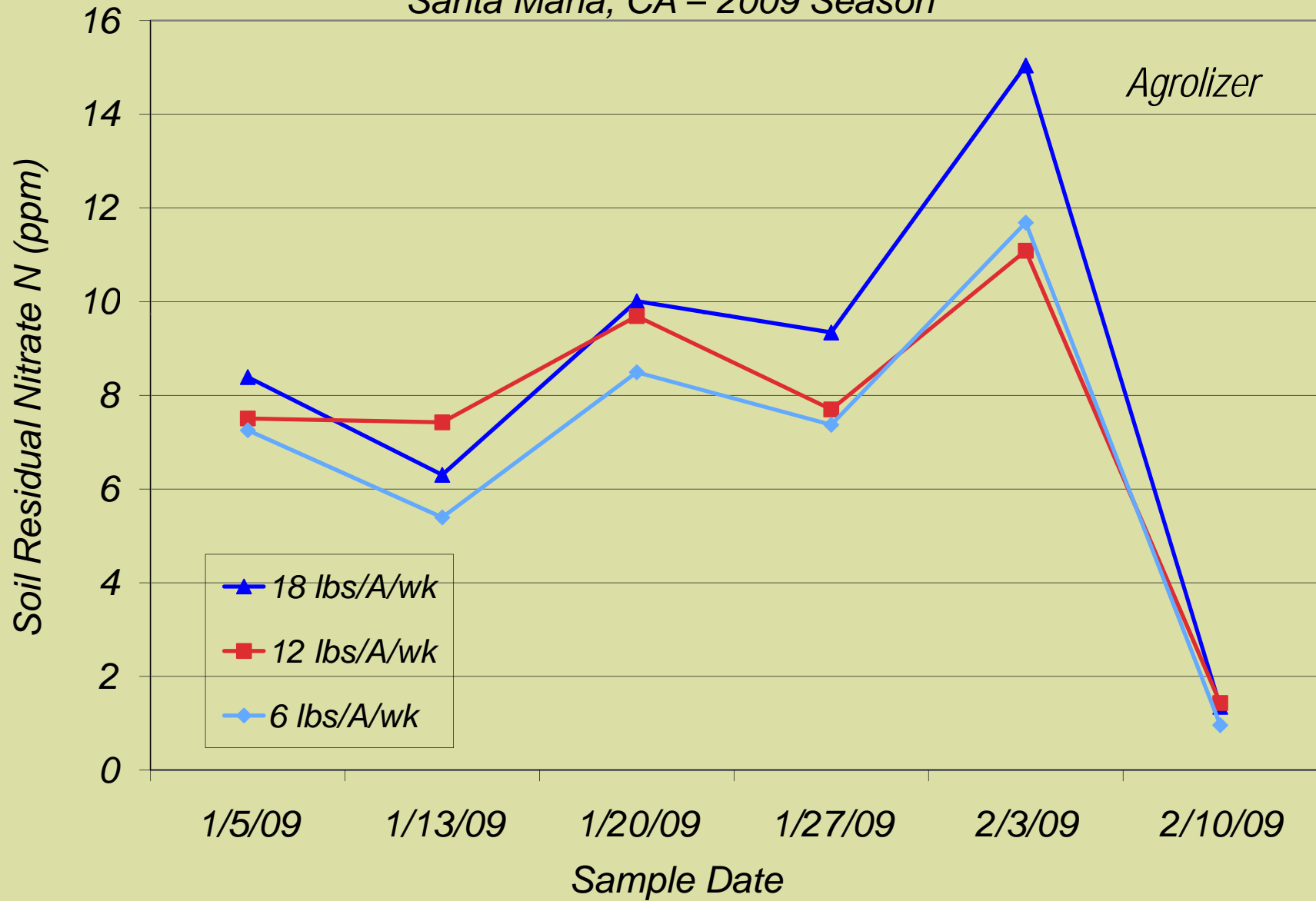
*Weekly average strawberry fruit weight from plots receiving varying rates of weekly organic N fertigation
Santa Maria, CA – 2008 Season*



Soil residual nitrate-N following application of varying rates of organic N fertigation
Santa Maria, CA - 2009 Season



*Weekly residual soil nitrate- N at varying weekly organic N fertigation rates
Santa Maria, CA – 2009 Season*





Phytamin® 801

Guaranteed Analysis

6-1-1

Total Nitrogen(N)	6.0%
5.0% Water Soluble Organic Nitrogen	
1.0% Water Insoluble Organic Nitrogen	
Available Phosphoric Acid (P ₂ O ₅)	1.0%
Available Potash (K ₂ O)	1.0%

Derived from seabird guano, fish solubles, and Potassium Sulfate.

Inert ingredients: vinegar and water
100% of ingredients disclosed

This product meets the Program Standards set forth by The National Organic Program (NOP) final rule 7CFR Part 205.

NON-PHYTOTOXIC:

To date, all crops tested have not shown any negative effects to treatments of **Phytamin® 801** at labeled rates. Mixes with other products require compatibility and phytotoxic testing by user.

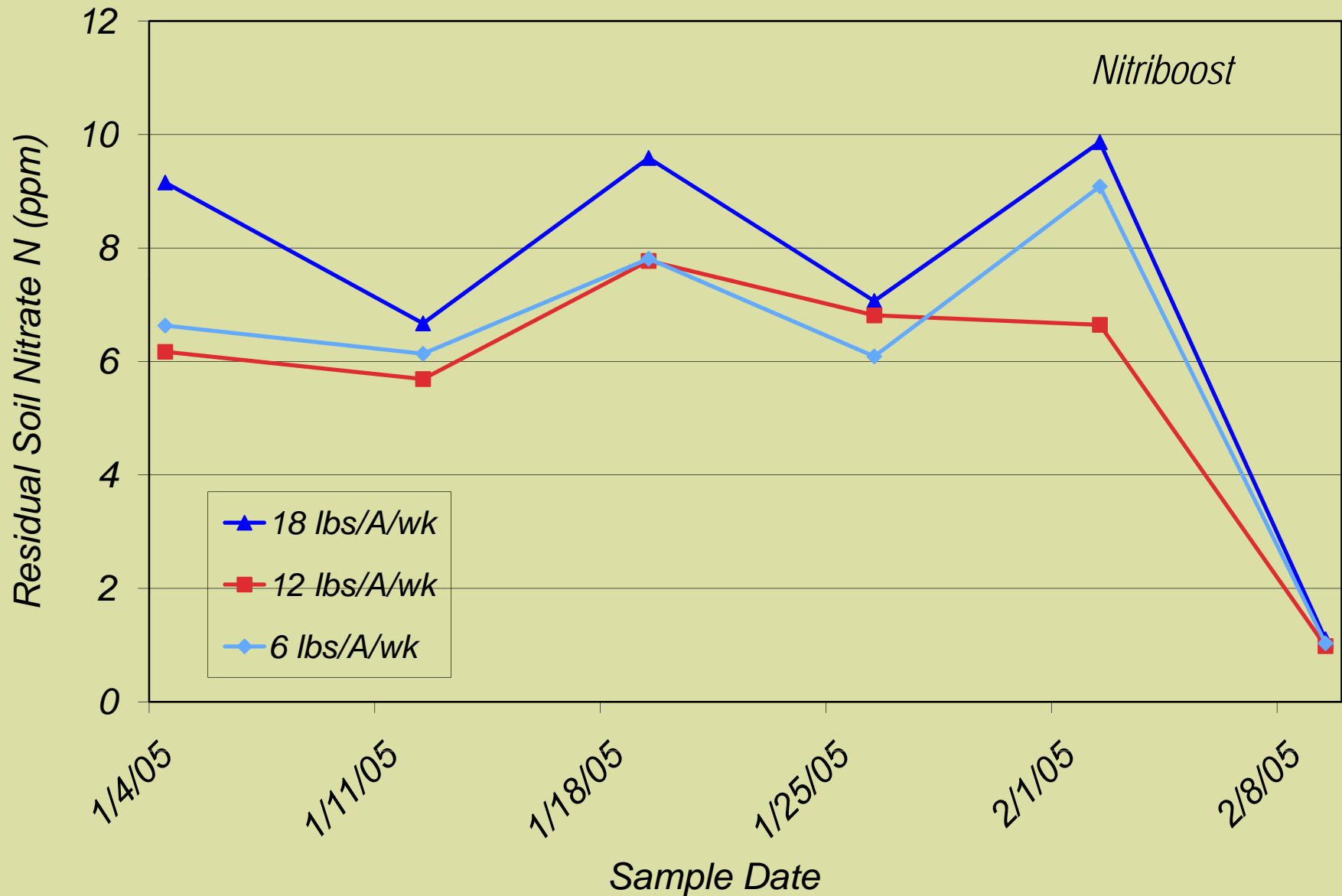
Call manufacturer if in doubt!

Fertigation

Application of **Phytamin® 801** is safe through most types of irrigation equipment including drip tape, aluminum pipe and overhead sprinkler systems. **Phytamin® 801** may not pass through some drip type irrigation systems. Always flush irrigation lines after **Phytamin® 801** treatment to prevent possible clogging or corrosion. Always inject **Phytamin®** products in front of any filter system. **Phytamin® 801** is mildly corrosive to aluminum in a concentrated form.

Not recommended for use in hydroponics. Please contact the manufacturer for information on special formulations.

Weekly residual soil nitrate N following application of varying rates of weekly organic N fertigation





Phytamin® 421

Guaranteed Analysis

4-2-1

Total Nitrogen(N)	4.0%
2.5% Water Soluble Organic Nitrogen	
1.5% Water Insoluble Organic Nitrogen	
Available Phosphoric Acid (P2O5).....	2.0%
Soluble Potash (K2O).....	1.0%

Derived from soy meal and plant extracts.

Inert ingredients: water
100% of ingredients disclosed

**This product meets the Program Standards set forth by
The National Organic Program (NOP) final rule 7CFR Part 205.**

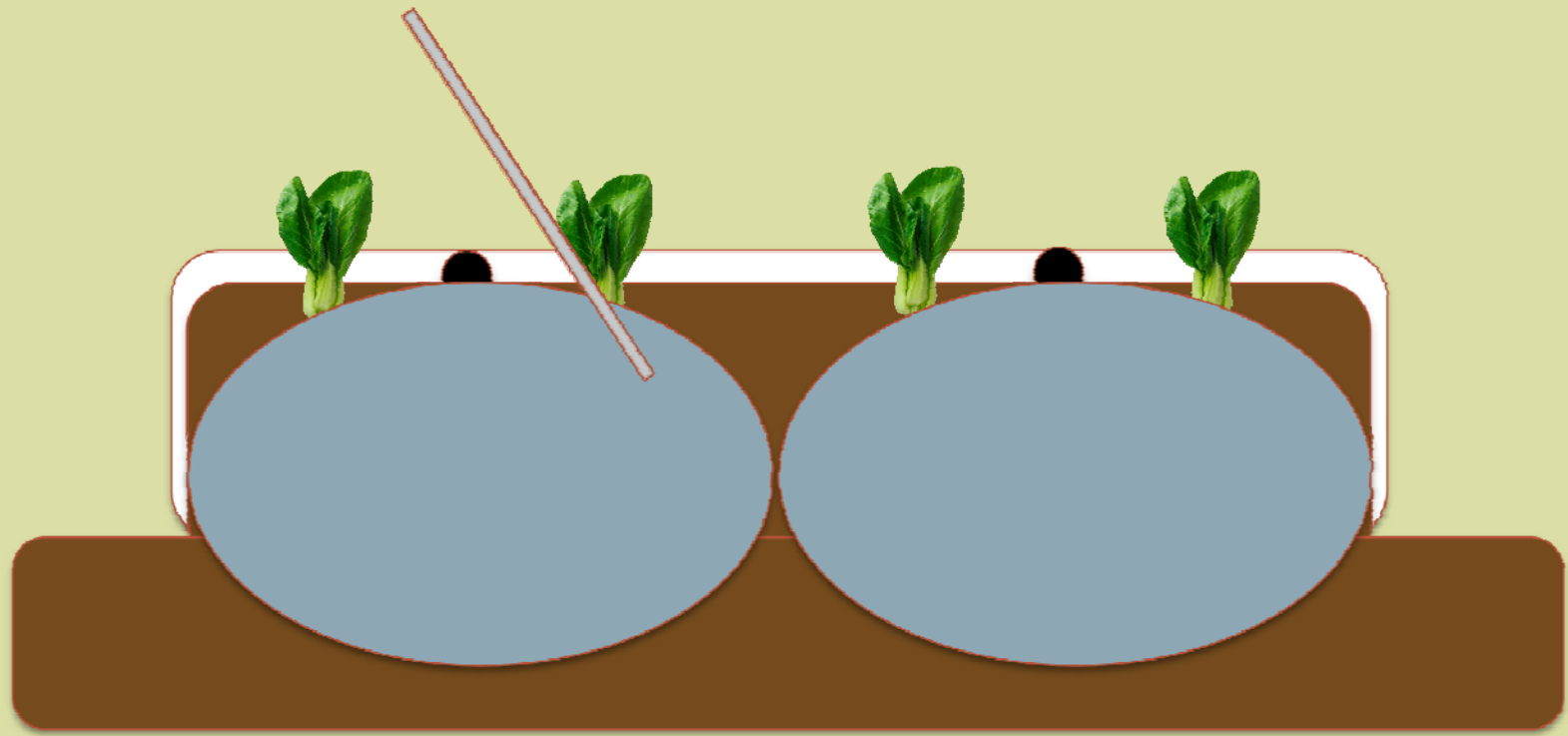
**This product does not contain any
animal manure or animal products.**

NON-PHYTOTOXIC:

To date, all crops tested have not shown any negative effects to treatments of **Phytamin® 421** at labeled rates. Mixes with other products require compatibility and phytotoxic testing by user.
Call Manufacturer if in Doubt!

Fertigation - IMPORTANT

Application of **Phytamin® 421** is safe through most types of irrigation equipment including drip tape and aluminum pipe. **Phytamin® 421** may not pass through some drip-type irrigation systems. A field test of a small section of drip tube is recommended prior to full use of **Phytamin® 421** through drip systems. Always flush irrigation lines after **Phytamin® 421** treatment to prevent possible clogging or corrosion. Always inject **Phytamin®** products in front of any filter system. **Phytamin® 421** is mildly corrosive to aluminum in a concentrated form.



Soil Nitrate – N Sampling?

Summary

In-season organic strawberry fertilization

- *No apparent effect of preplant compost.*
- *Challenge is to match N availability with crop demand.*
- *Diverse liquid organic fertilizers but little known about most efficient materials, rates, timing of applications.*
- *Strawberries have little appreciable N uptake until mid-February (12 weeks post transplant) in Santa Maria.*
- *Plant growth and yield directly related to weekly applied N in the range of 3, 6, 12 lb N per acre week.*
- *Current trials confirming soil and plant parameters with expanded range of materials and fertigation rates.*

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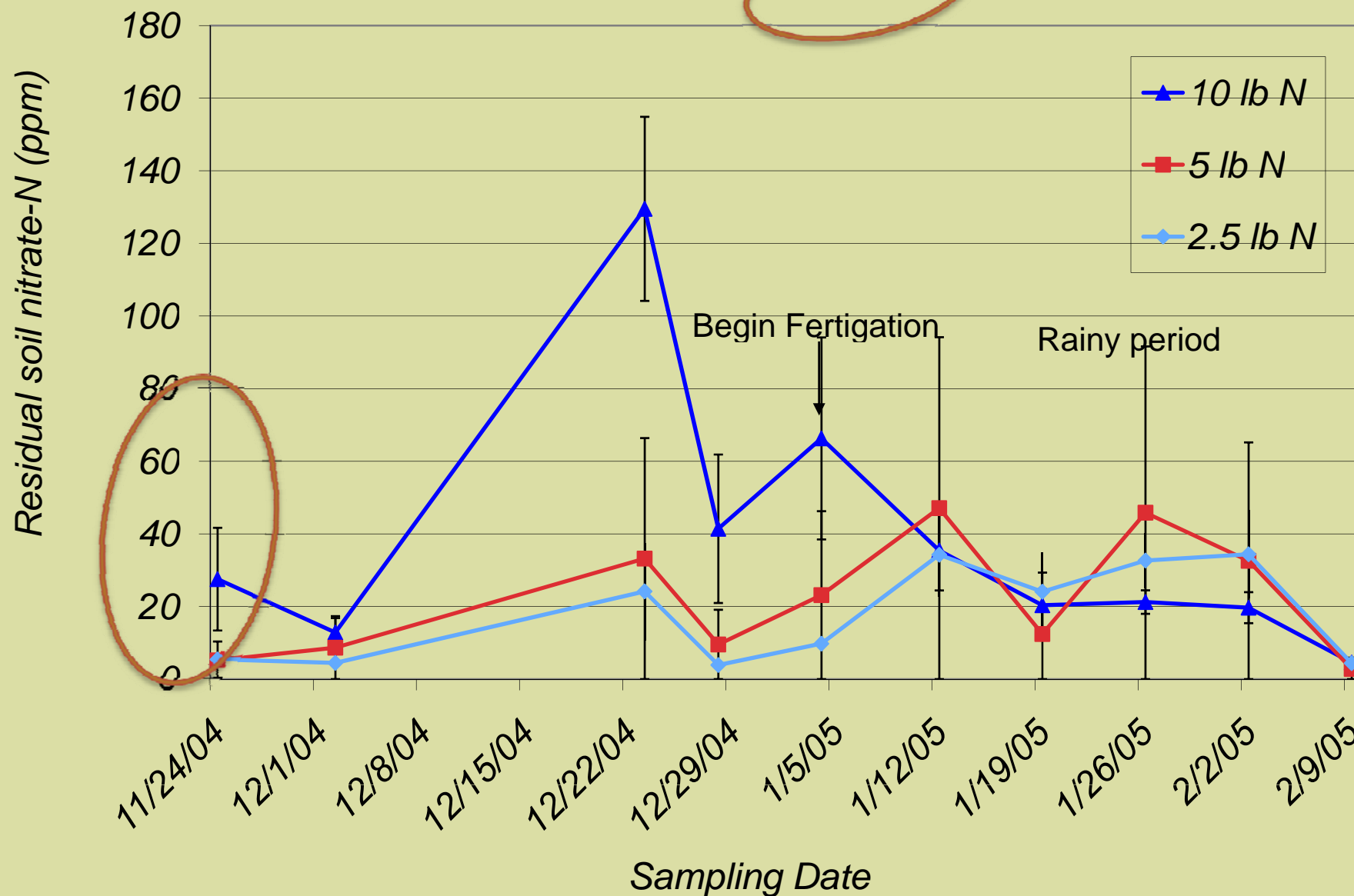
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Weekly residual soil nitrate-N at varying in-season N fertilization rates (CAN 17)



Weekly Residual Soil Nitrate-N at Varying Weekly
N Fertigation Rates (CAN 17)-

