

Zinc Nutrition for Prune Production

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Zinc Deficiency



Zinc Deficiency “Little Leaf” Disorder



February 22, 2005



Zn Deficient

Zn Sufficient

Zinc Deficiency In Nectarines





Zinc Nutrition

Sampling for zinc

Soil applications

Foliar applications

Materials

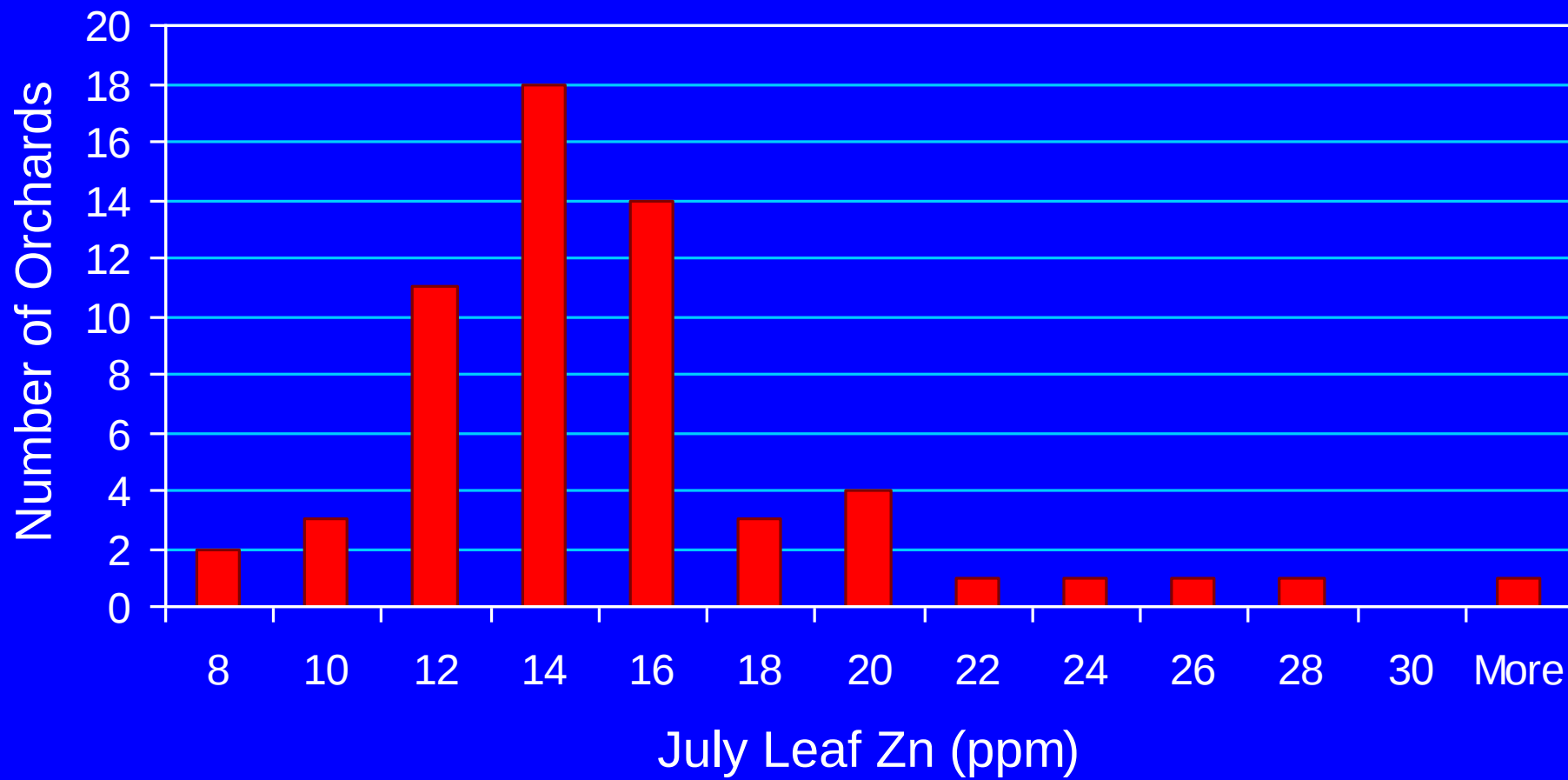
Timing

Nutrient Elements in Stone Fruit

Level in leaves

	PEACHES AND NECTARINES				PLUMS		
	Deficient below	Optimum range	Toxic over		Deficient below	Optimum range	Toxic over
	%	%	%		%	%	%
N	2.3	2.6 - 3.0	-		-	2.3 - 2.8	-
P	-	0.1 - 0.3	-		-	0.1 - 0.3	-
K	1.0	Over 1.2	-		1.0	Over 1.1	-
Ca	-	Over 1.0	-		-	Over 1.0	-
Mg	0.25	Over 0.25	-		0.25	Over 0.25	-
Cl	-	-	0.3		-	-	0.3
S	-	-	-		-	-	-
	p p m						
Fe	60	Over 60	-		-	-	-
Mn	20	Over 20	-		20	Over 20	-
Zn	15	Over 20	-		18	Over 18	-
B	18	20 - 80	100		25	30 - 60	80
Cu	-	Over 4	-		4	Over 4	-
Mo	-	-	-		-	-	-

Orchard Survey - Zinc















EnviroSul

MICRONUTRIENTS

NET WEIGHT / POIDS NET
25 KG / 55.115 LBS



CODE 615/G

SULPHUR 65% + ZINC 18%

REGISTRATION NUMBER

FERTILIZERS ACT

GUARANTEED MINIMUM ANALYSIS

Sulphur (S)	65.00%
Zinc (Zn)	18.00%

Derived from Zinc Oxide and Elemental Sulphur.
RECOMMENDATIONS: For effective use, Tiger micronutrients should be surface broadcast and incorporated at least one year prior to planting.
CAUTION: This fertilizer contains Zinc and should be used only as recommended. It may prove harmful when misused. Always consult a professional agronomist for advice on use.

L'ANALYSE DE MINIMUM GARANTIE

Soufre (S)	65.00%
Zinc (Zn)	18.00%

CONSEILS: Pour que les micro nutriments Tiger fassent de l'effet, il faudrait les répandre à la surface et les incorporer au moins un an avant de planter.
PRÉCAUTION: cet engrais contient du zinc et ne devrait être utilisé qu'en suivant les conseils. Il peut s'avérer dangereux s'il n'est pas utilisé correctement. Il faut toujours.

NUMÉRO D'ENREGISTREMENT
LOI SUR LES ENGRAIS

TO BE USED IN BLENDING FERTILIZER FOR SOIL APPLICATION

RISKS:
WARNING - POISON: May be fatal if swallowed.
PRECAUTIONS:
Do NOT take internally. Avoid eye or skin contact. Do not breathe dust.
Store in cool, dry, well-ventilated area. Keep out of reach of children.
Wash thoroughly after use. Use with adequate ventilation. This container is hazardous when empty - all labeled precautions must be observed.
FIRST AID:
Wash thoroughly with water for at least 15 minutes if irritation.

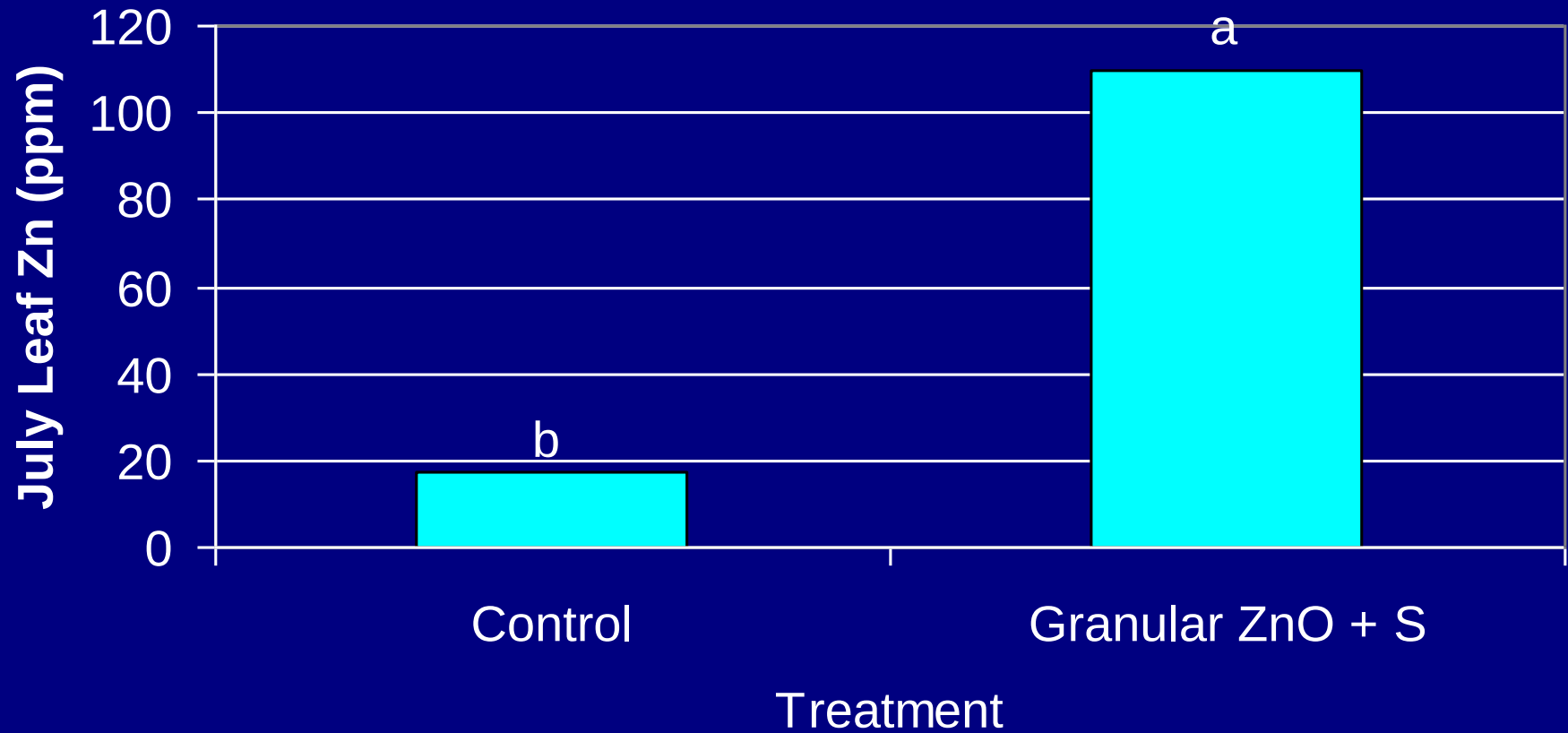
POUR EMPLOI EN MÉLANGE D'ENGRAIS POUR APPLICATION AU SOL

RISQUES:
AVERTISSEMENT - POISON: L'ingestion peut entraîner la mort.
Risque d'irriter pour les yeux, la peau et les voies respiratoires.
PRÉCAUTIONS:
Ne pas ingérer. Éviter tout contact avec les yeux ou la peau. Ne pas respirer les poussières. Entreposer dans un endroit frais, sec et bien ventilé. Garder hors de la portée des enfants. Se laver soigneusement après toute utilisation. Utiliser avec une ventilation adéquate. Ce contenant est dangereux lorsqu'il est vide. Toutes les précautions mentionnées sur l'étiquette doivent être observées.
PREMIERS SECOURS:
Rincer abondamment à grande eau pendant au moins 15 minutes.

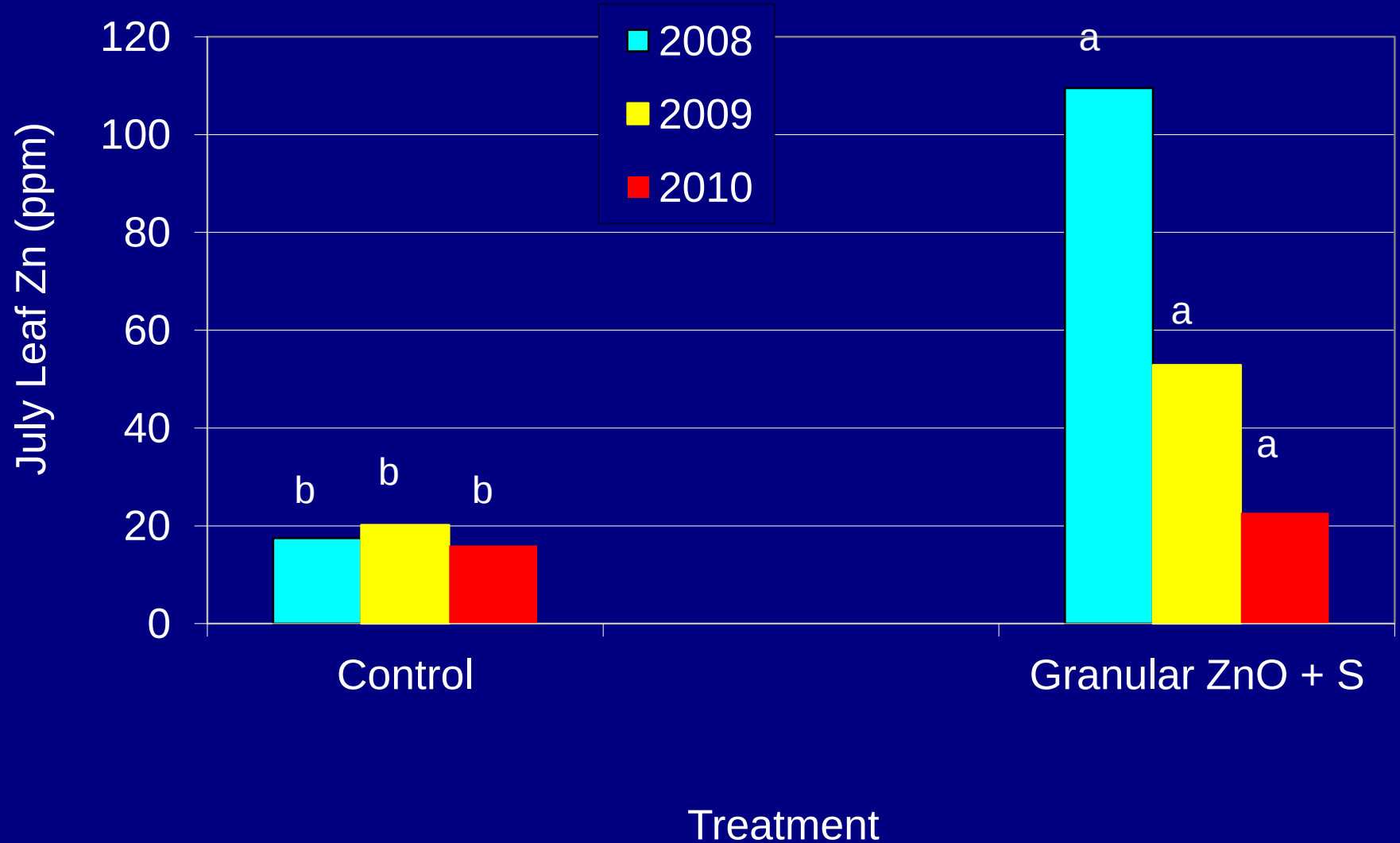




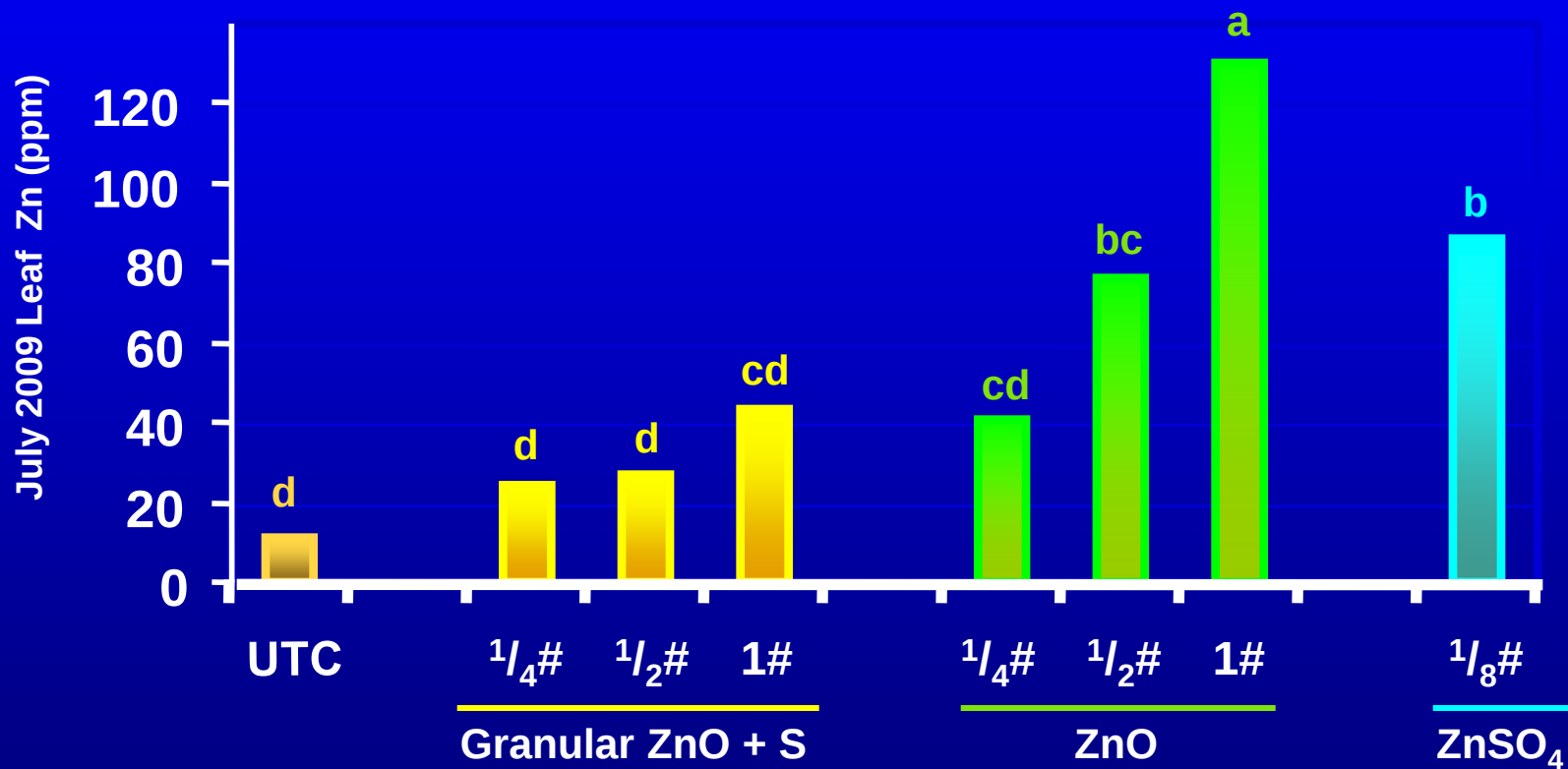
Granular ZnO + Sulfur Material Added to Planting Hole of Peach (1.25 lbs/tree)



Granular ZnO + Sulfur Material Added to Planting Hole of Peach (1.25 lbs/tree)



Zinc Materials Added to Planting Hole of Friar / Nemaguard Plums February 2009











Zinc Materials

Basic Chemicals

- Zn sulfate
- Zn oxide
- Zn carbonate
- Zn chloride
- Zn oxysulfate
- Zn nitrate

Chelates & Complexes

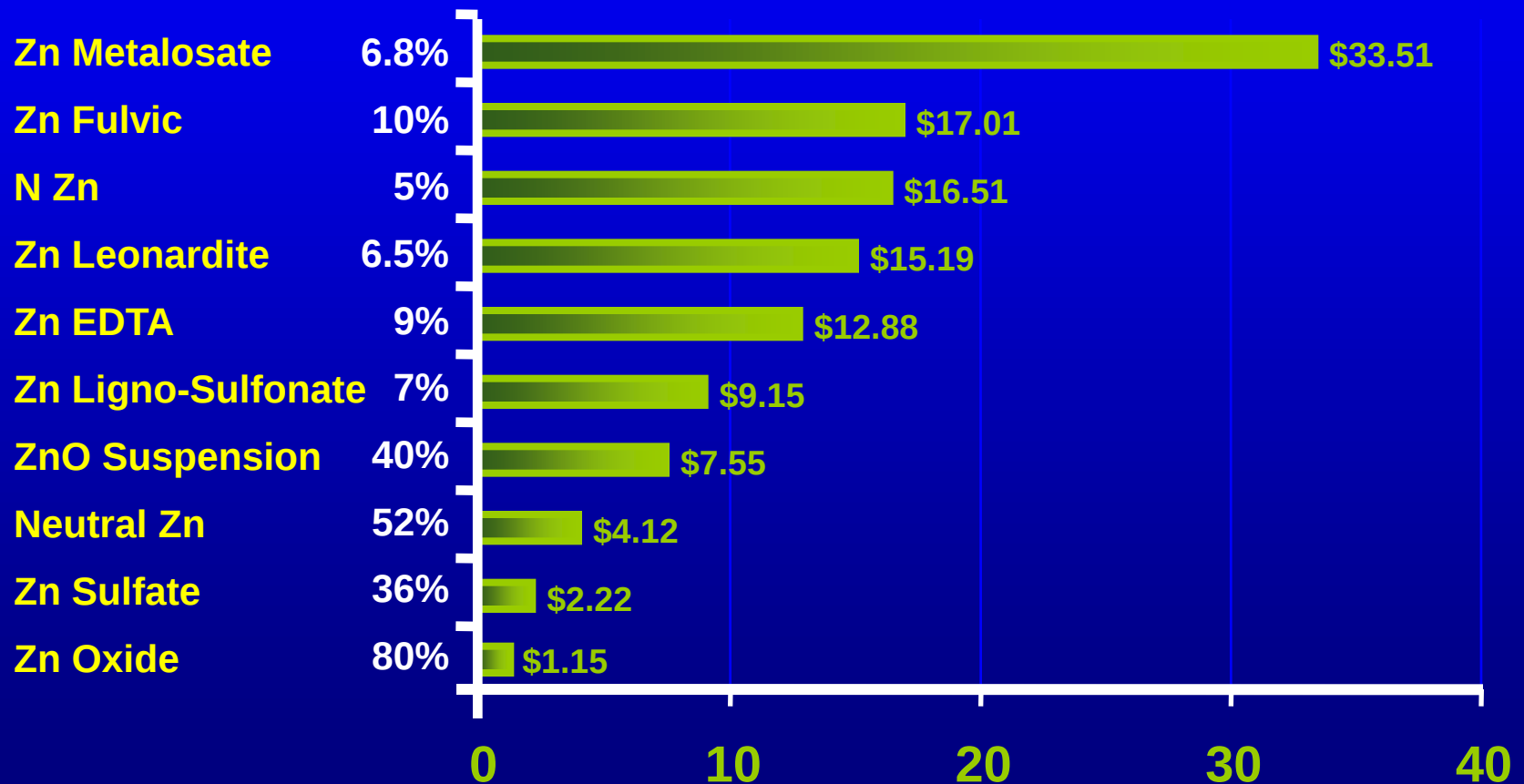
- EDTA
- Lignosulfonate
- Amino acid
- Sugar
- Citric acid
- Fulvic acid, humic acid

Zinc Materials

Commonly Used Formulations

- Zn sulfate – 36% Zn – very soluble
- Basic or Neutral Zinc – 52% Zn – very insoluble mixture of Zn sulfate (1%) & Zn oxide (99%)
- Suspensions of Zn oxide – 40% Zn
- Zn chelate – 6 to 9% Zn – usually EDTA
- Zn metalosate – 7% Zn – amino acid complex
- Zn complexes – 5 to 10% Zn – generally expensive

Cost of Zinc Materials - October 2007





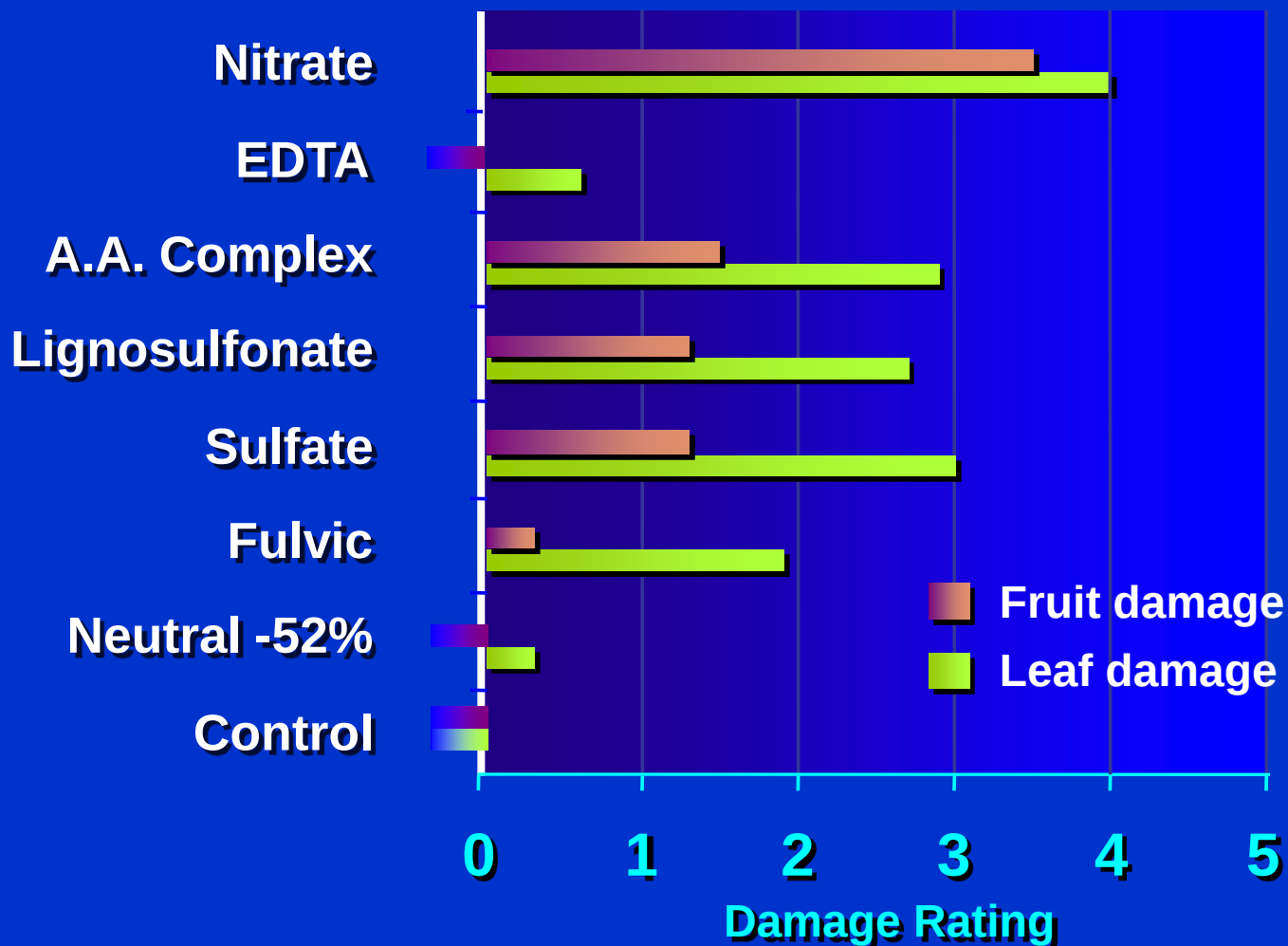
Fruit Damage from Zinc Sprays







**Leaf & Fruit Damage on Peach, Plum and Apricot Trees
Sprayed in April with Different Formulations of Zn at 1,000 ppm**



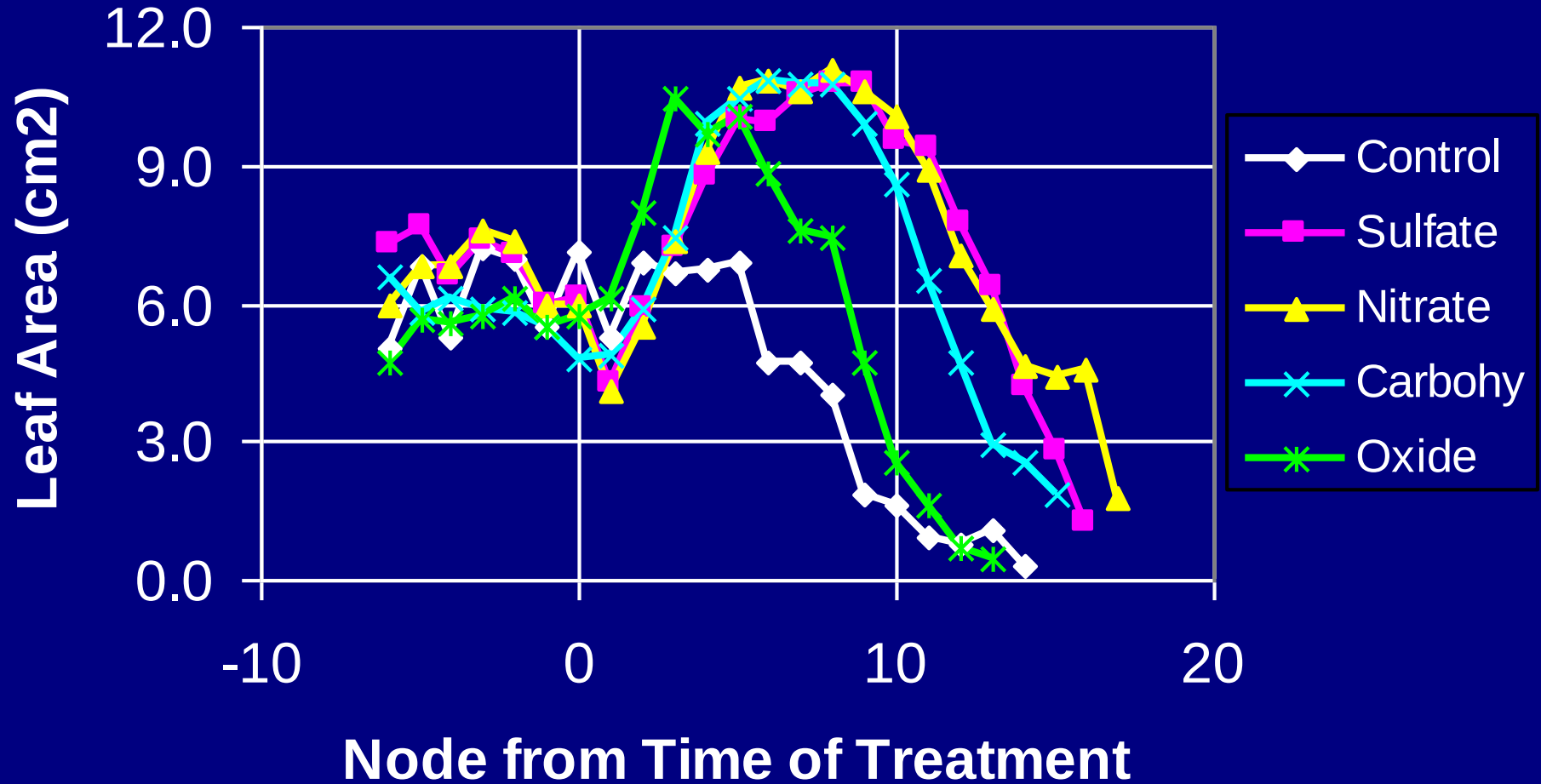








Leaf Area of Individual Leaves



Comparing Zinc Formulations

<u>Ranking</u>	<u>Formulation</u>	<u>Anion Size</u>	<u>Solubility</u> (g/100 H ₂ O)	<u>Phytotoxicity</u>
<u>Most Effective</u>	Zinc Chloride	35	432	High (58*)
<u>Almost As Good</u>	Zinc Nitrate	62	324	High (54)
	Zinc Nitrate Mix	62 & 96	324	High (59)
<u>Next Best</u>	Zinc Sulfate	96	50	Moderate (12)
	Zinc Carbohydrate	96 & ?	High	Moderate
	Zinc Polyamine	96 & 75-204	High	Moderate
	Zinc Glycine	96 & 75		Moderate (15)
<u>Less Effective</u>	Zinc EDTA	292	High	Low
	Zinc Leonardite	1000+	High	Low
	Zinc Oxysulfate	16 & 96	1.3	None
<u>Least Effective</u>	Zinc Phosphite	79	?	Low (17)
	Zinc Oxide Suspension	16	Insoluble	None

Zinc Materials

Zinc Sulfate

- Inexpensive
- Very soluble
- Widely used
- Most cost effective Zn material
- Can be phytotoxic

AG Specialties BRAND		
ZINC SULFATE		
(Monohydrate)		
Guaranteed Analysis		
Sulfur (S)		17%
17% Combined Sulfur (S)		
Zinc (Zn)		35%
35% Combined Zinc (Zn)		
Derived from Zinc Sulfate		
TYPICAL Heavy Metals		
As.....	5PPM	Se.....5PPM
Cd.....	10PPM	Ni.....20PPM
Co.....	10PPM	Pb.....10PPM
Hg.....	1PPM	Mo.....5PPM

Caution: Harmful if inhaled. Causes irritation of eyes, skin and respiratory tract. Harmful if swallowed. Avoid breathing dust. Do not get in eyes, on skin, or clothing. Wear eye protection and protective clothing. Wash thoroughly after handling.

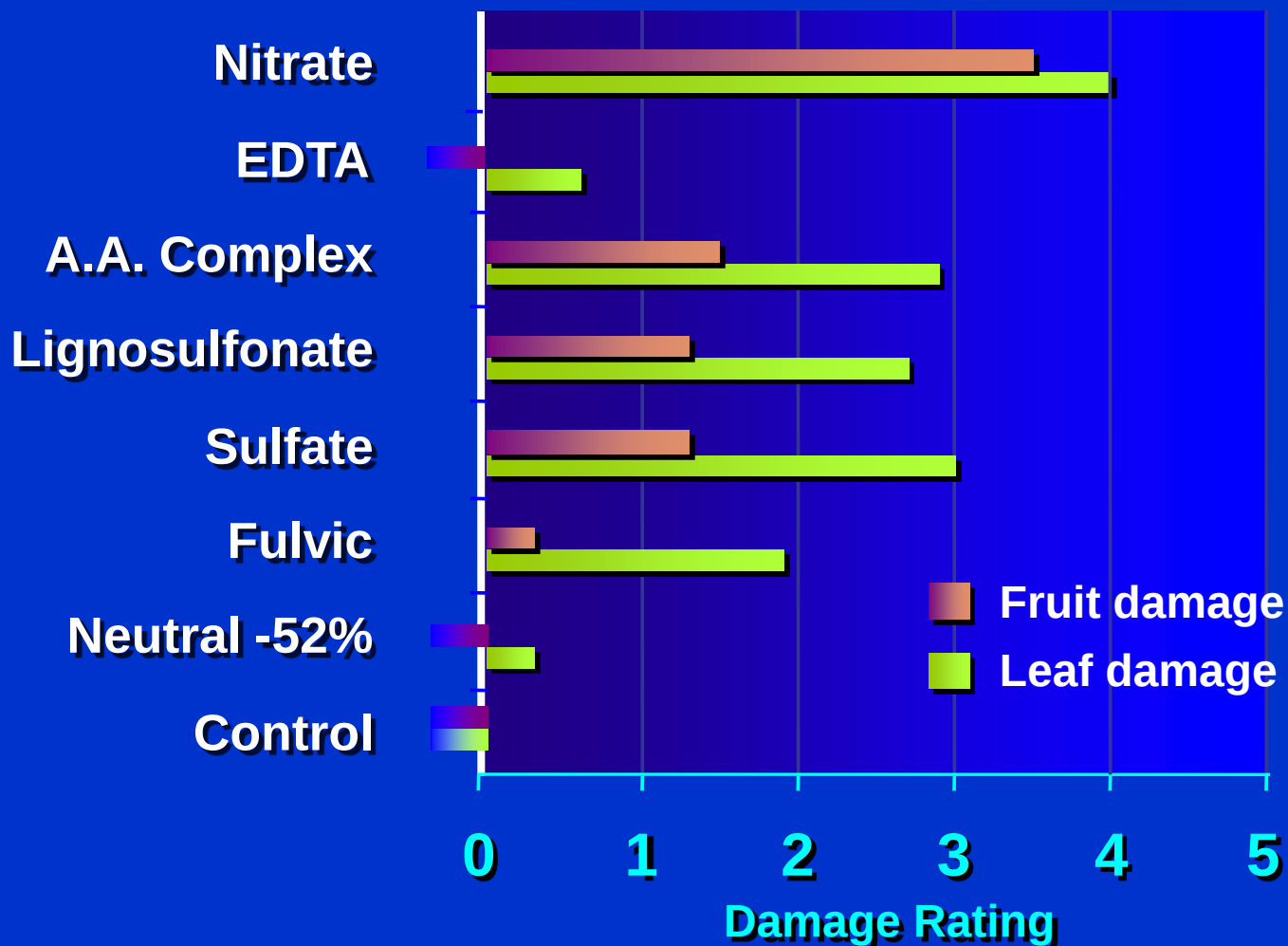
First Aid: In case of Contact: Immediately flush eyes and skin with plenty of water for at least 15 minutes. For eyes, get medical attention. If inhaled: Move to fresh air.

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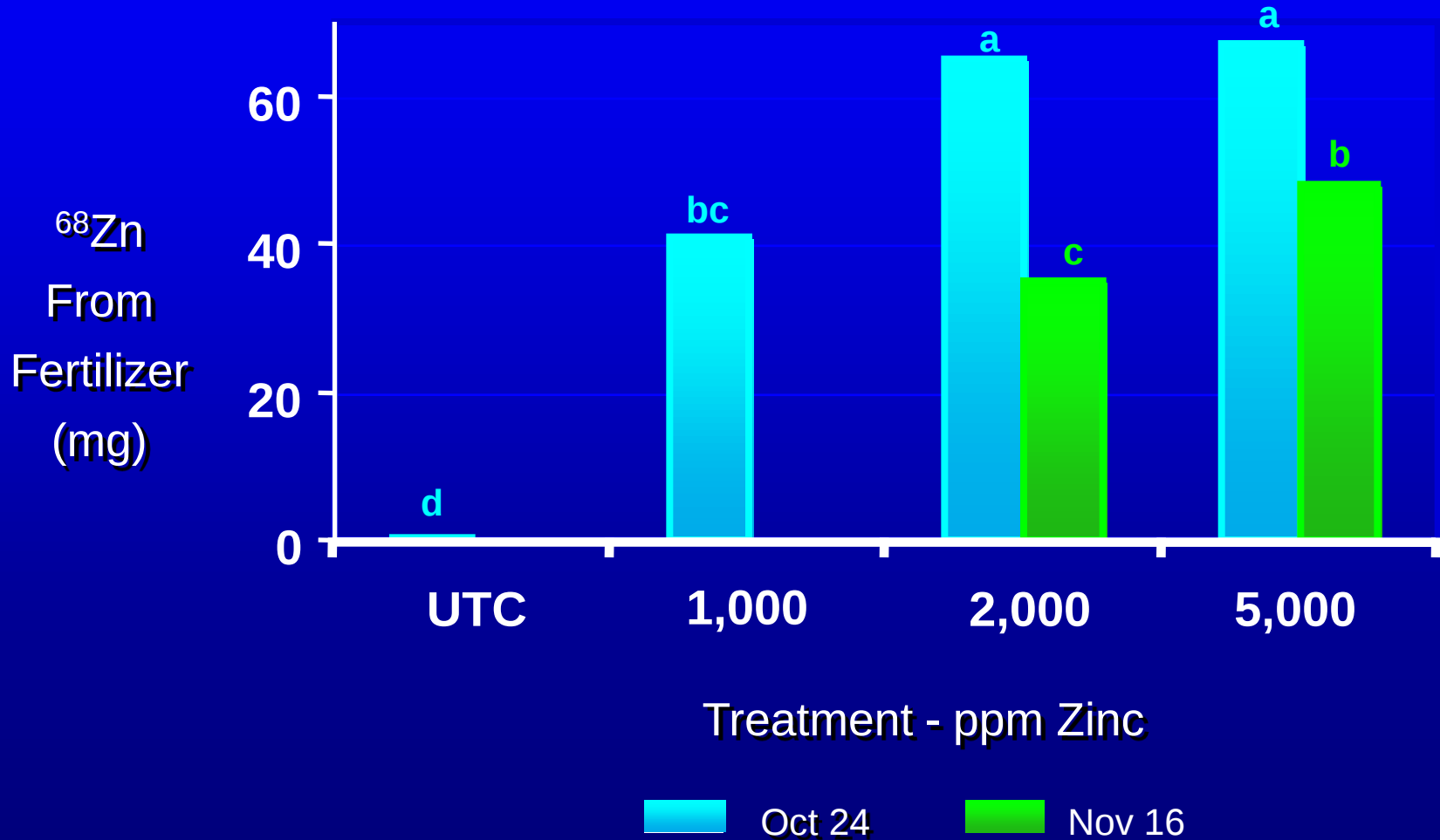






Nursery Trees in Pots - Fall Foliar $^{68}\text{ZnSO}_4$

Rates and Timing - ^{68}Zn in Plant









Zinc Fertilization

- Apply if symptoms appear or leaf Zn < 10 to 12 ppm
- Apply zinc to planting hole of newly planted trees
- If needed in mature trees – spray 4 to 8 lbs/acre of zinc sulfate (36% Zn) in early fall



http://ucanr.org/sites/fruitreport/

Rootstocks - Fruit Report - Windows Internet Explorer

http://ucanr.org/sites/fruitreport/Rootstocks/

Google Search

Rootstocks - Fruit Report

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University of California Fruit Report

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Orchard Establishment
Rootstocks

- Search by Name
- Search by Characteristics
- NC-140 Rootstock Trials
- Calif. Breeding Program

Varieties
Pruning & Training
Pollination
Thinning
Girdling
Nutrition & Fertilization
Irrigation

Rootstocks

Nemaguard has been the standard rootstock in California peach, plum and nectarine orchards for many years. Recently, a variety of new rootstocks have become available from numerous breeding programs around the world. This section provides information on the characteristics of these stocks.



Search for Rootstock by:

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