



Rootstock Selection for Salinity Management

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UCCE Merced

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A little bit of background...

1990: Warren Micke and Lonnie Hendricks established a rootstock trial in the Atwater/Livingston Area

- Atwater Sand
- 6 Rootstocks: Brights Hybrid, Halford, Hansen, Lovell, Nemaguard, Nemared,
- Spacing: 24' x 24'
- 5 blocks of 6 trees established in RCBD

A little bit of background...

Hendricks retired in 2001, ending the continuous data collection

Around the orchards 15th year, marginal leaf scorching started to appear on peach rootstocks

Possible differences in salt tolerance?

A little bit of background...

Salt Burn

UC Cooperative Extension

Salt burn:

- Accumulated amounts of salt within the tissue become toxic
- Salts come from fertilizers, manures, irrigation water
- Stresses the trees – makes them “work harder” for the water
- Winter rains often leached salts out rooting profile
- Growers can apply leaching fraction to reduce

A little bit of background...

Sources of Salt within
rootstock trial:

- Fertilizer
- Manures/compost
- Irrigation water:

	Sodium (meq/liter)	Calcium (meq/liter)	Magnesium (meq/liter)	Carbonate (meq/liter)	Chloride (meq/liter)	E.C. mmhos/cm
Well	6.35	2.10	5.59	0.00	0.63	0.28
UC Values	3.0				4.0	

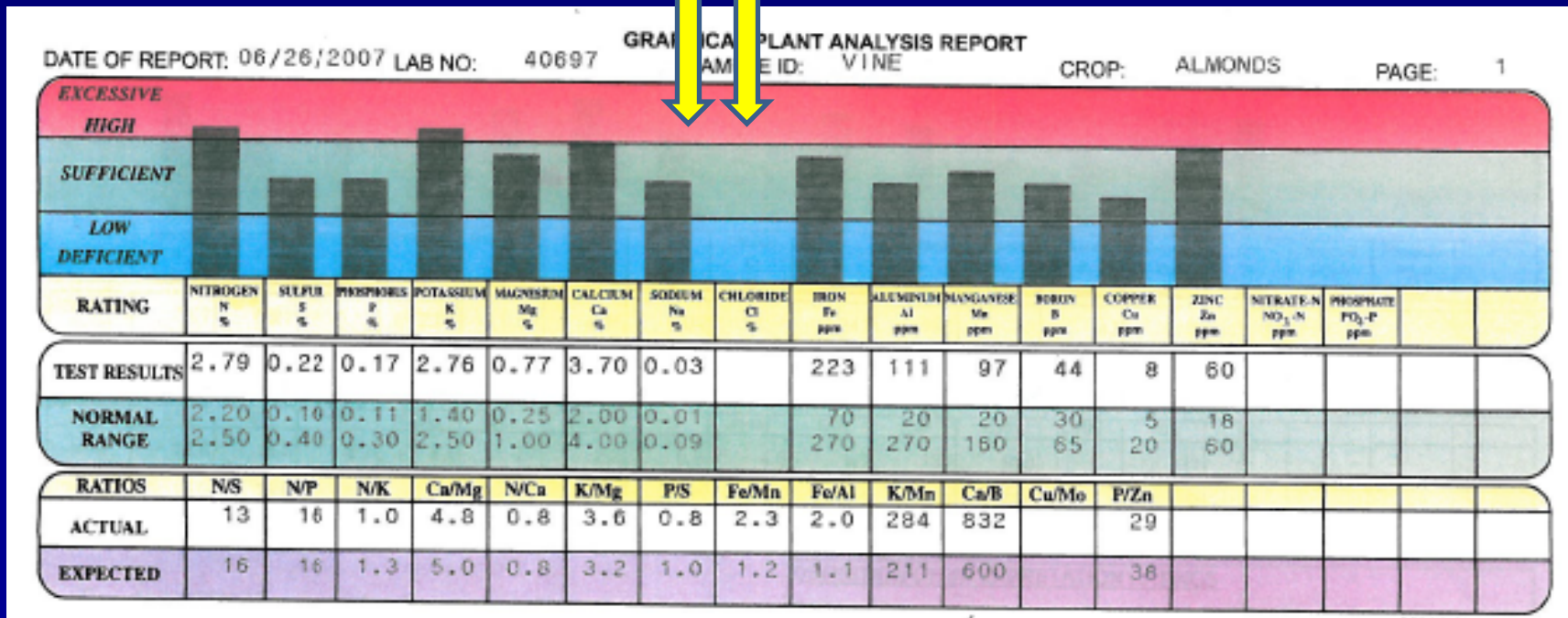
A little bit of background...

A profile soil sample will tell if salt is accumulating:

	E.C. (dS/m)	Sodium (meq/L)	Chloride (meq/L)
1'	0.19	0.55	0.31
2'	0.19	0.82	0.30
3'	0.81	3.12	0.94
4'	1.25	5.05	1.24
5'	0.93	3.96	0.93
UC Value		<5.0	<5.0

A little bit of background...

Leaf tissues were pulled from non-fruiting spurs in Mid-July:



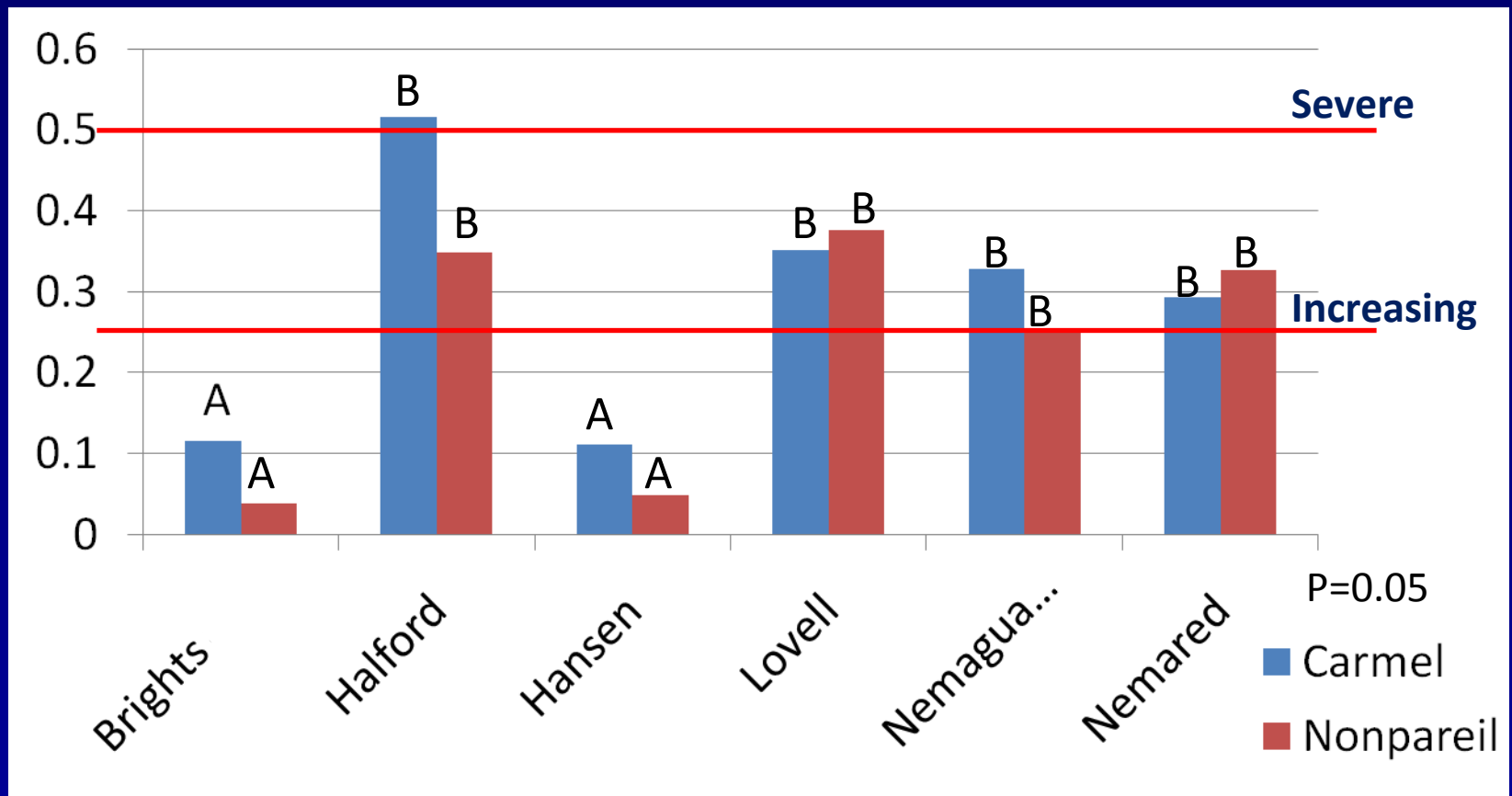
A little bit of background...

Critical Values for July Leaf Sampling

	Sodium %	Chloride %
None	<0.25	>0.3
Increasing	0.25-0.40	0.3-0.5
Severe	>0.4	>0.5

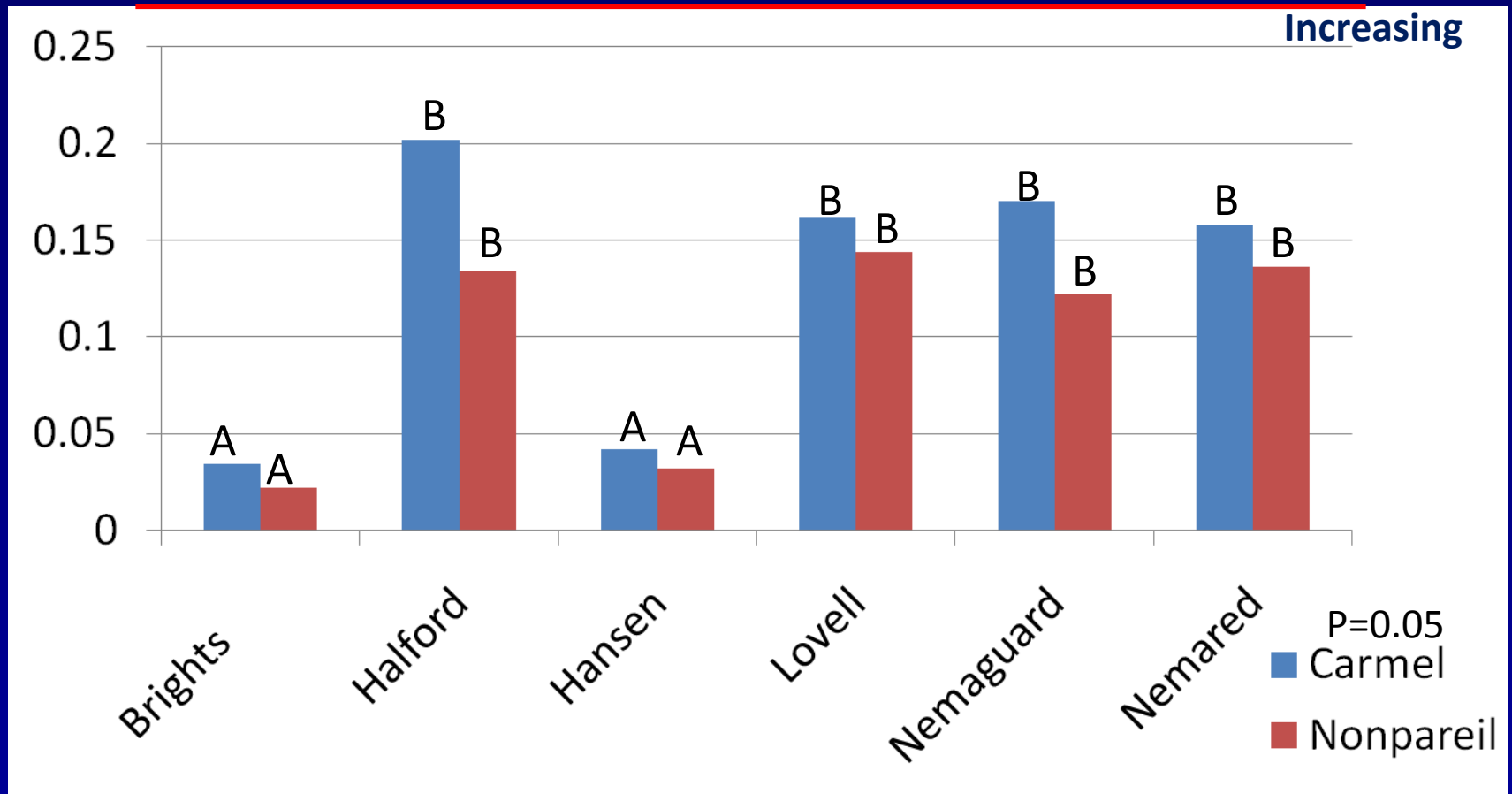
Does the rootstock impact salt tolerance?

Sodium % within leaf tissues



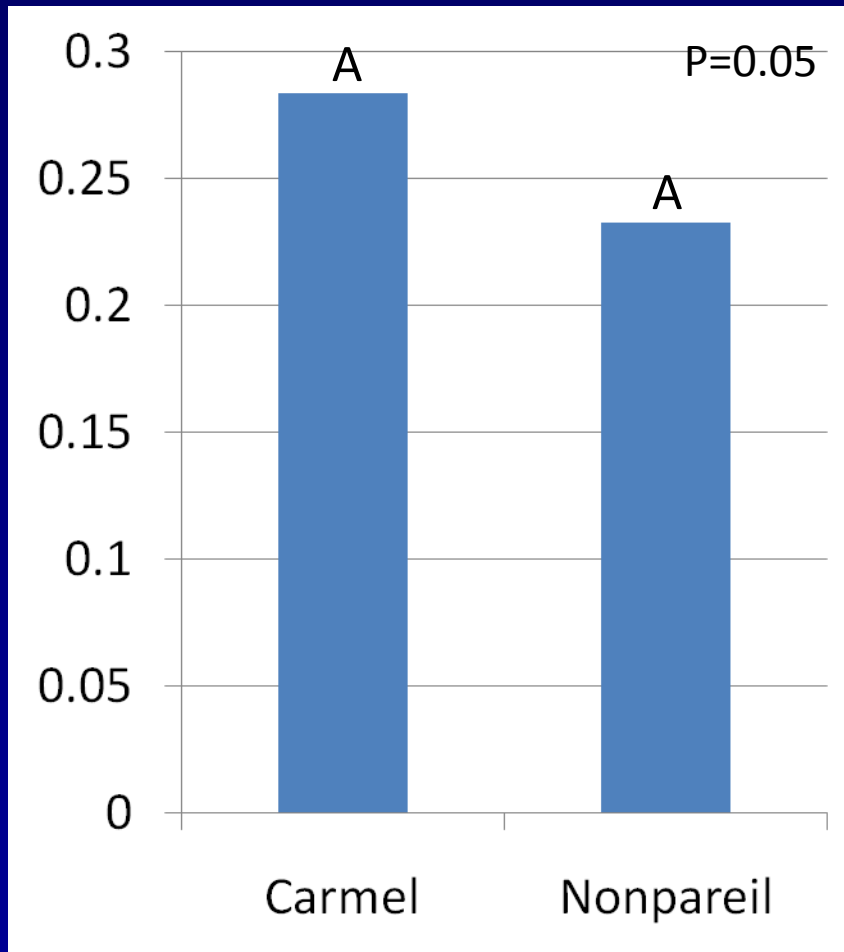
Does the rootstock impact salt tolerance?

Chloride % within leaf tissues



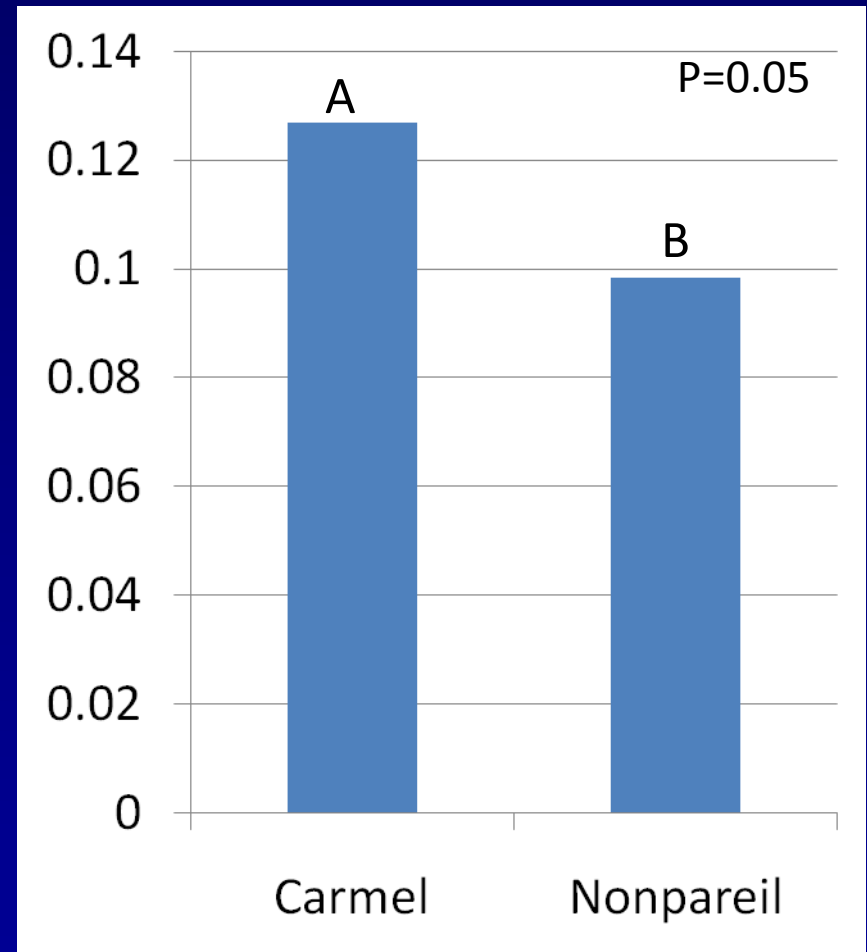
Does the variety impact salt tolerance?

Sodium



NO

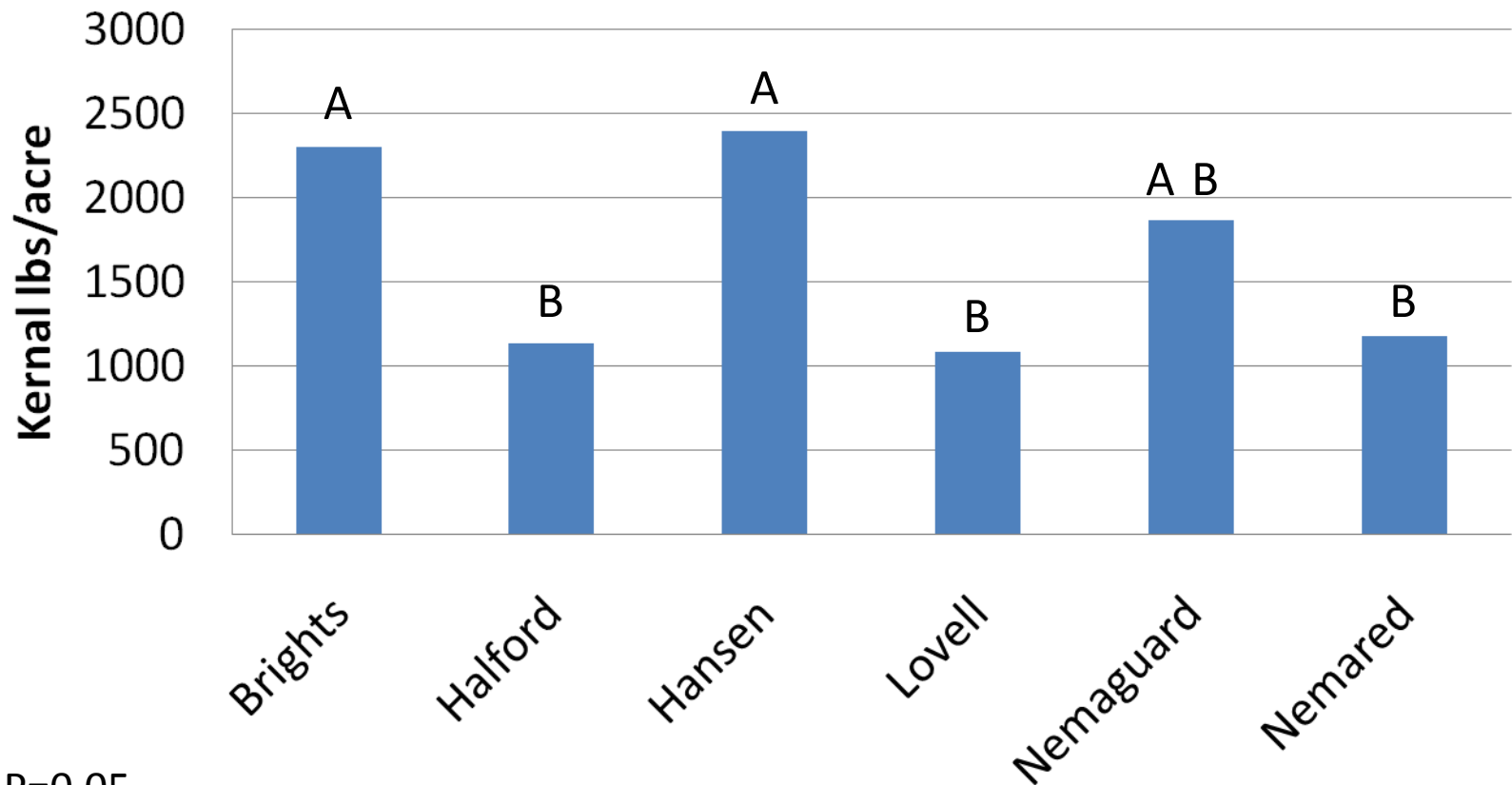
Chloride



YES

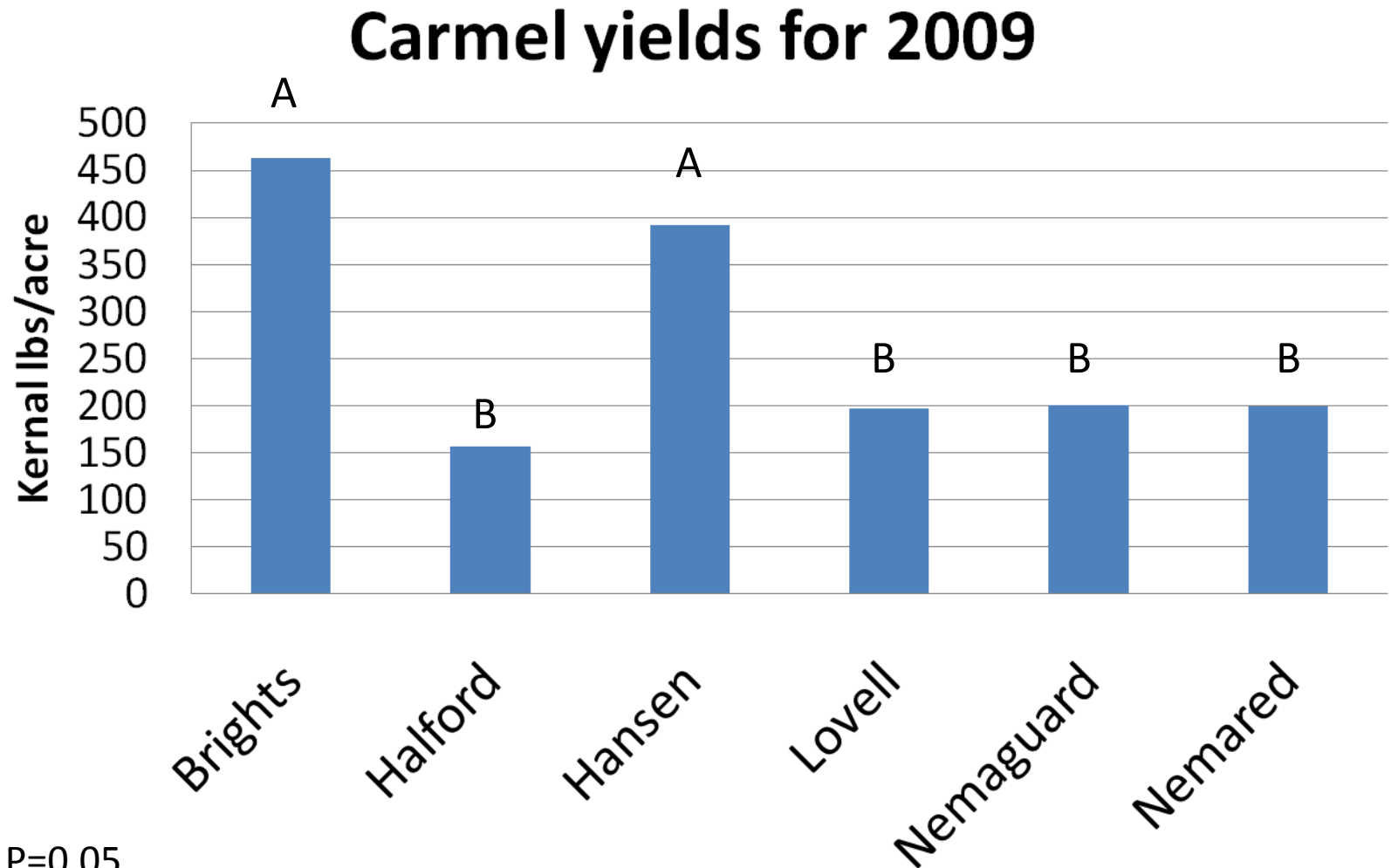
What about yield?

Nonpareil yields for 2009



P=0.05

What about yield?



P=0.05

Orchard View - Lovell



Carmel

Nonpareil

Orchard View- Brights Hybrid



Carmel

Nonpareil

Orchard View - Halford



Carmel

Nonpareil

Orchard View - Hanson



Carmel

Nonpareil

Orchard View - Nemaguard



Carmel

Nonpareil

Orchard View - Nemared



Carmel

Nonpareil

Conclusions

- Sampling of irrigation water, soil profile, and tissue sampling should be done to monitor salt build up
- Peach Almond Hybrids have a higher salt tolerance than peach rootstocks
- Yields after 20 years are higher on peach almond hybrids than on peach rootstocks in the conditions of the trial.
- Growers can use P/A hybrids to help manage salt in orchards, BUT:
 - Many P/A hybrids are susceptible to ring nematode and bacterial canker complex
 - It should not take the place of proper irrigation/salt management – i.e. leaching coefficient

Acknowledgements:

Arnold Farms for hosting the trial, helping with harvest, and maintaining the trial during the 7 year absence of a farm advisor.

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Online weekly update about almond production at www.thealmonddoctor.com

