



Horticulture (Abscission agents)

THE ABSCISSION AGENT CMNP AS AN AID TO MECHANICAL HARVESTING OF SWEET ORANGE

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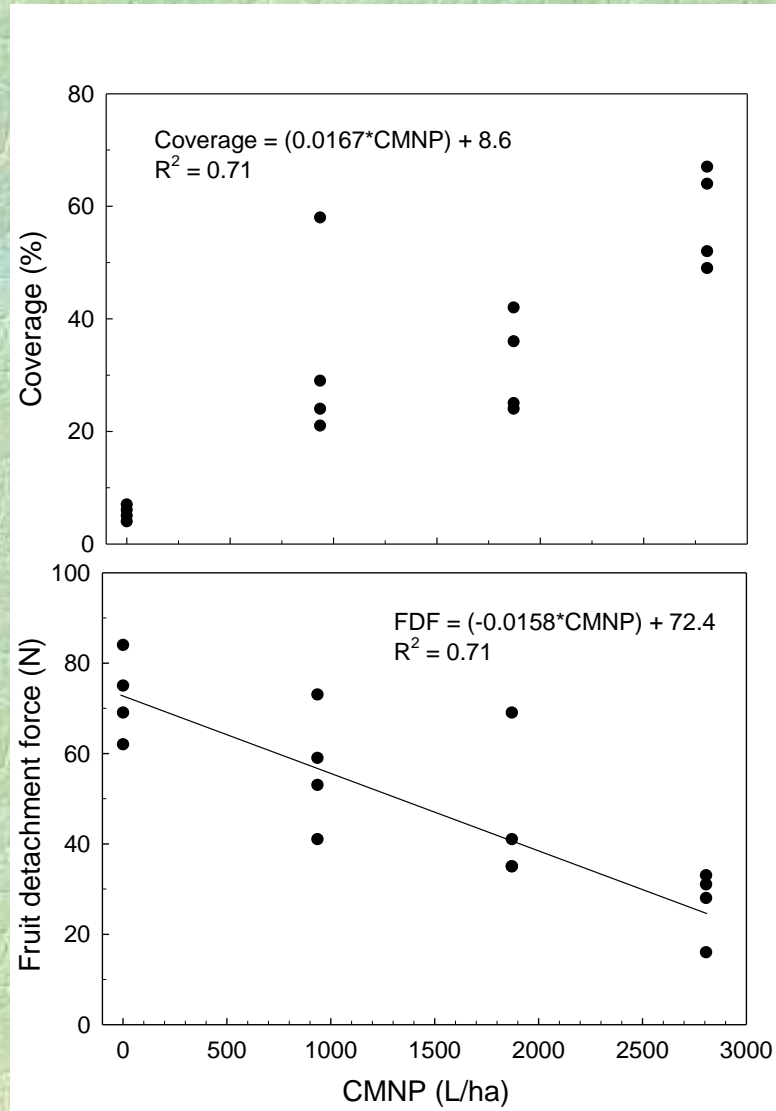
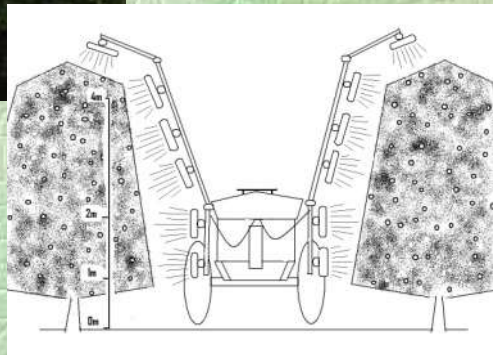
INTRODUCTION

- Strong industry interest in mechanical harvesting of sweet oranges in Florida
 - ❖ Current mechanical harvester fruit removal rates: 70% - 90% of the crop
 - ❖ Goal: to find an abscission agent that increases removal rates
- CMNP (5-Chloro-3-Methyl-4-Nitro-1H-Pyrazole)
 - ❖ Of abscission agents tested, CMNP most effective
 - ❖ 1st publication in 1973
 - ❖ An application for full registration has been submitted to the EPA
 - ❖ Best Management Practices (BMPs)

CMNP EFFICACY AND SPRAY CONSIDERATIONS



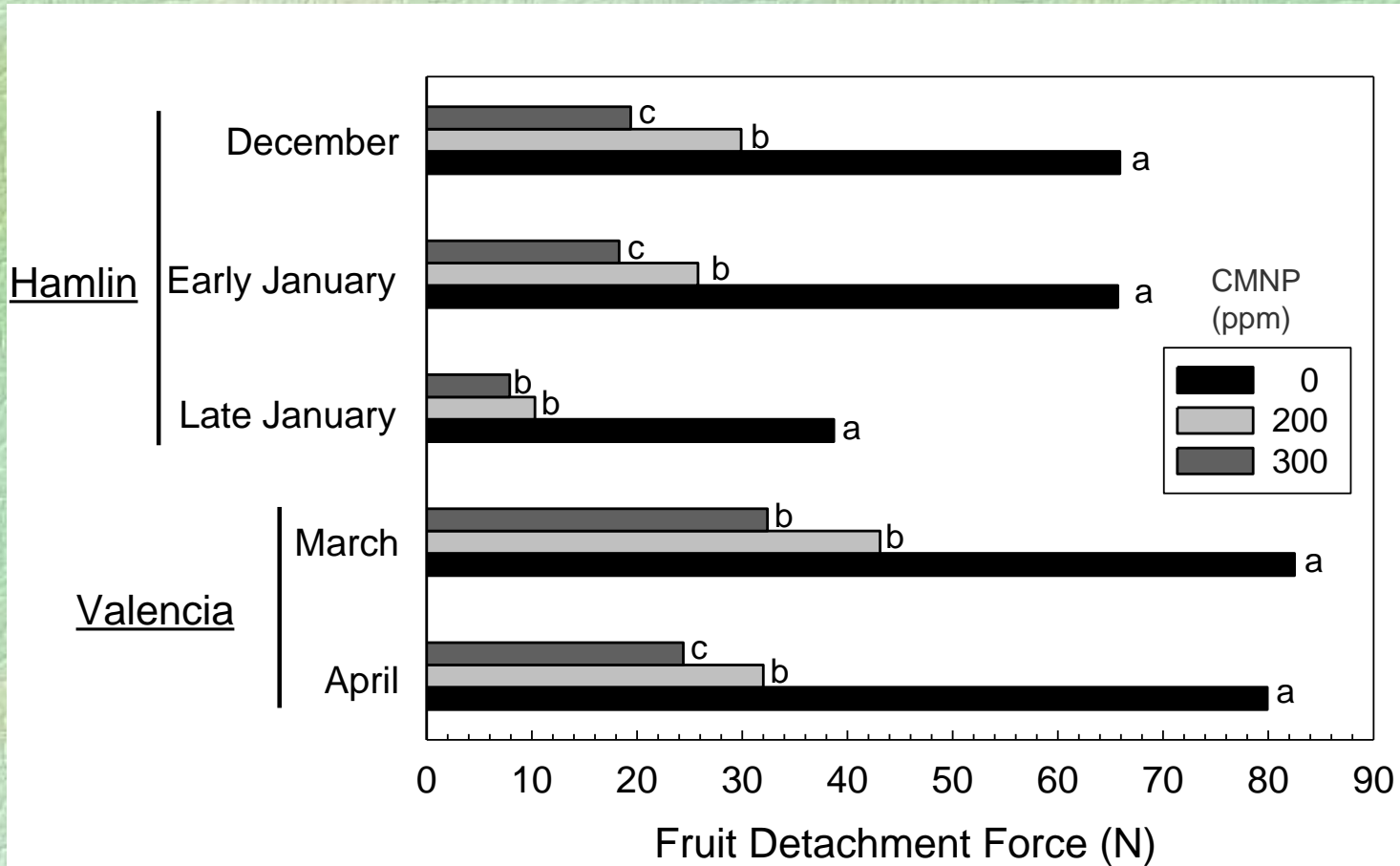
- Requires direct contact with the fruit



CMNP EFFICACY AND SPRAY CONSIDERATIONS



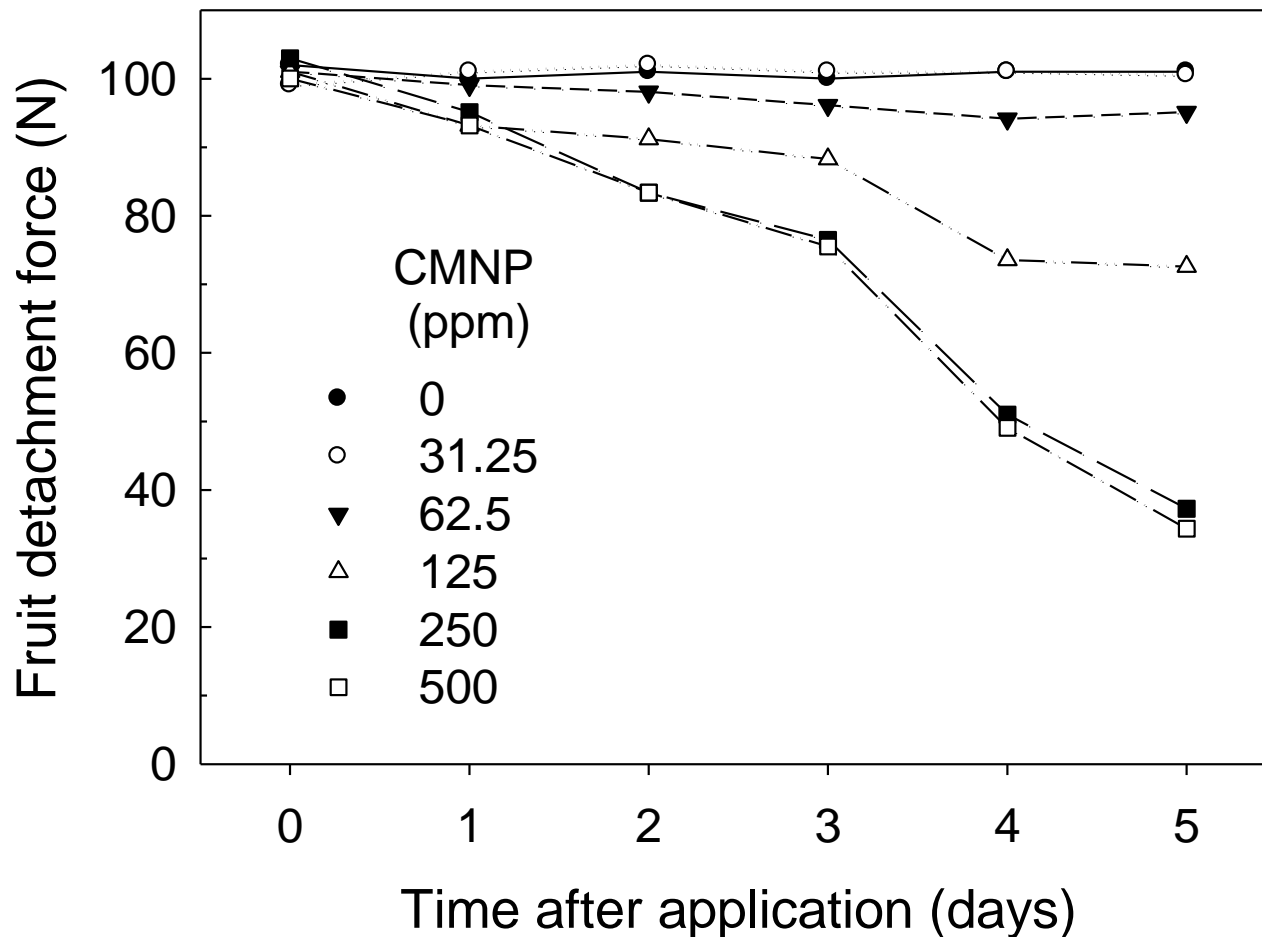
- Application rates of 200 – 300 ppm at up to 300 gal/acre provide excellent and consistent loosening throughout the harvest season



CMNP EFFICACY AND SPRAY CONSIDERATIONS



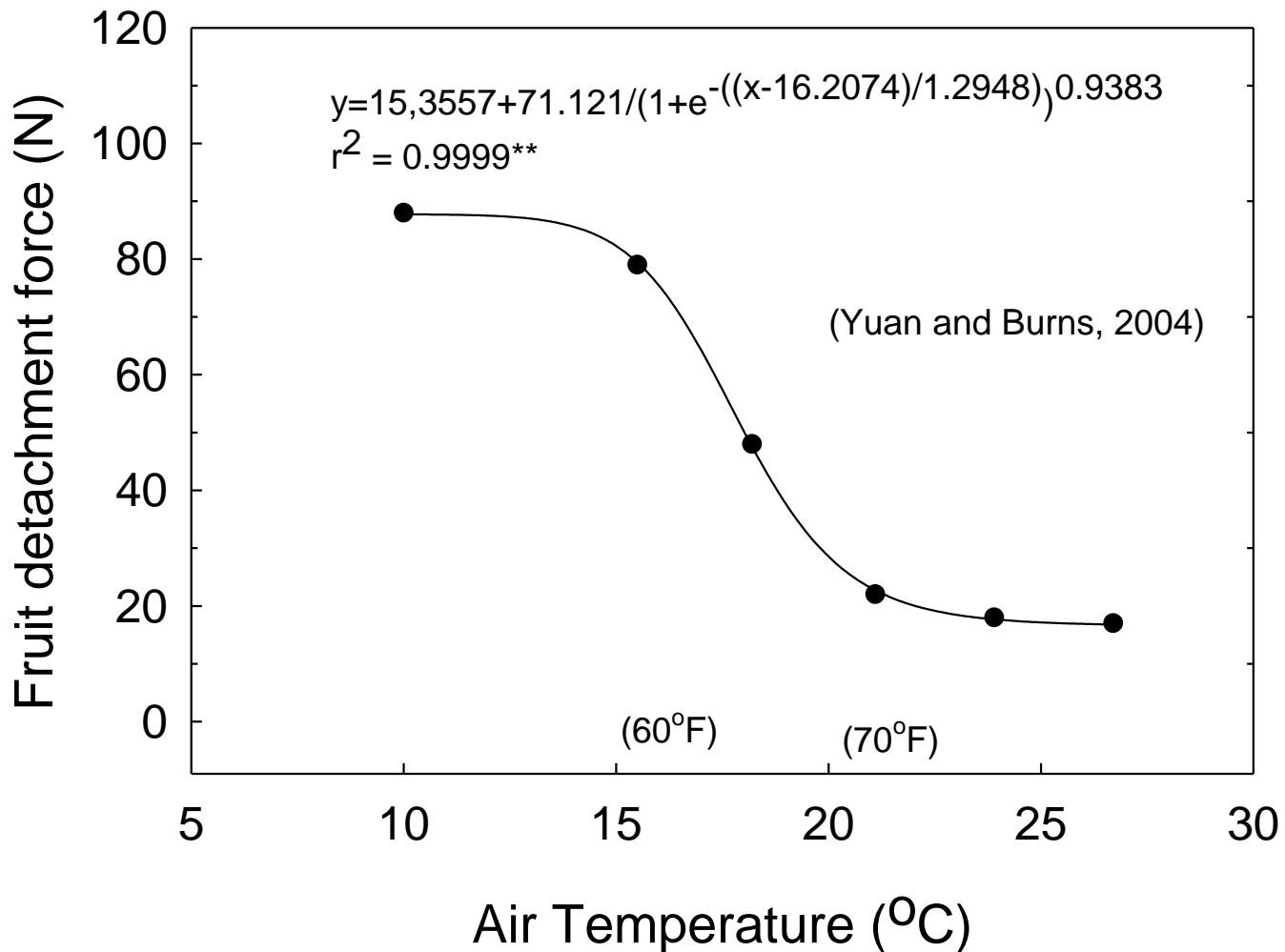
- Loosening occurs up to 5 days after application



CMNP EFFICACY AND SPRAY CONSIDERATIONS



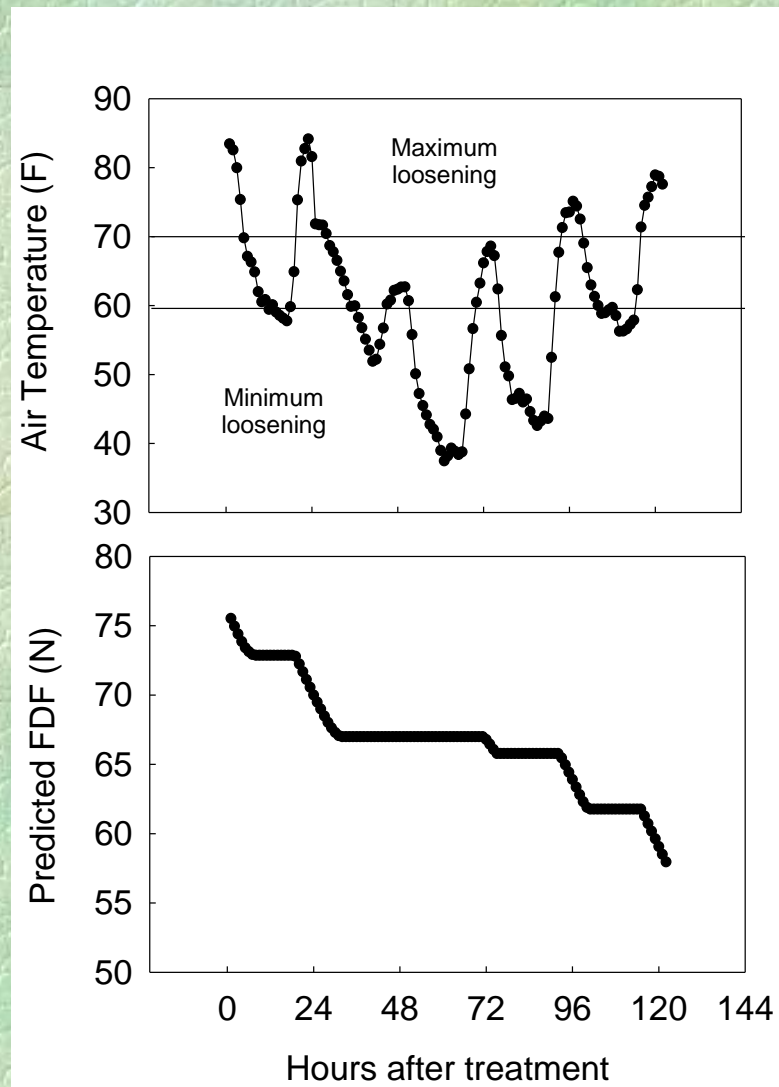
- Air temperature < 20°C delays loosening



CMNP EFFICACY AND SPRAY CONSIDERATIONS



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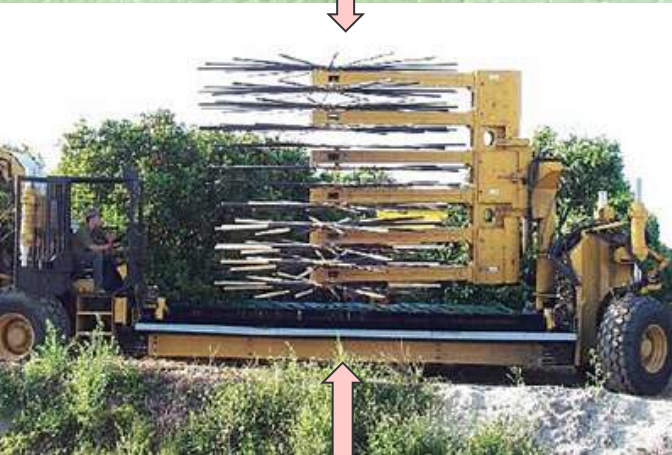


HARVEST EFFICIENCY AND OTHER ADVANTAGES

Self-propelled canopy shaker



Shaker



Catch frame



HARVEST EFFICIENCY AND OTHER ADVANTAGES

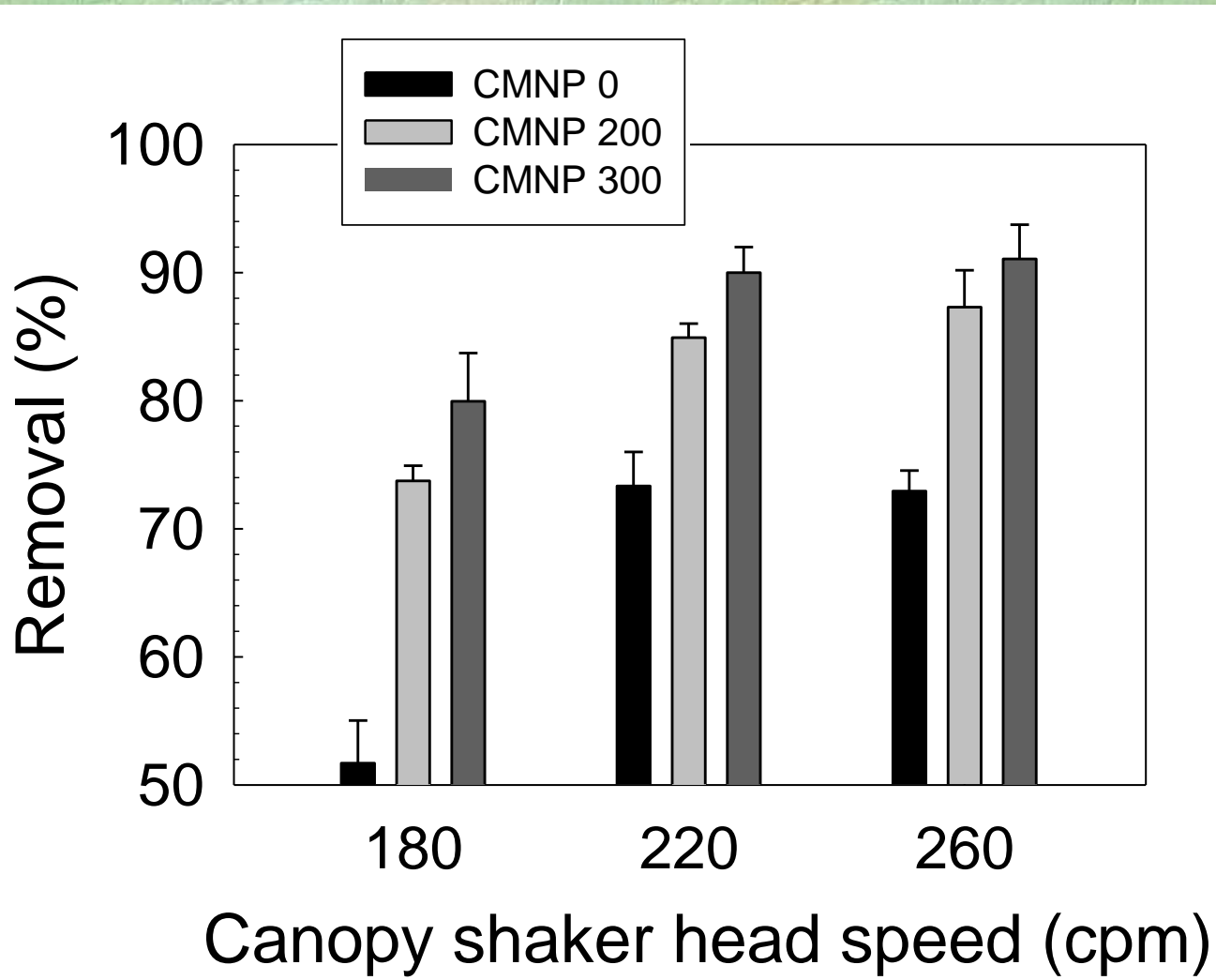
Pull-behind canopy shaker



HARVEST EFFICIENCY AND OTHER ADVANTAGES



- Higher fruit removal at lower canopy shaker head speeds with CMNP

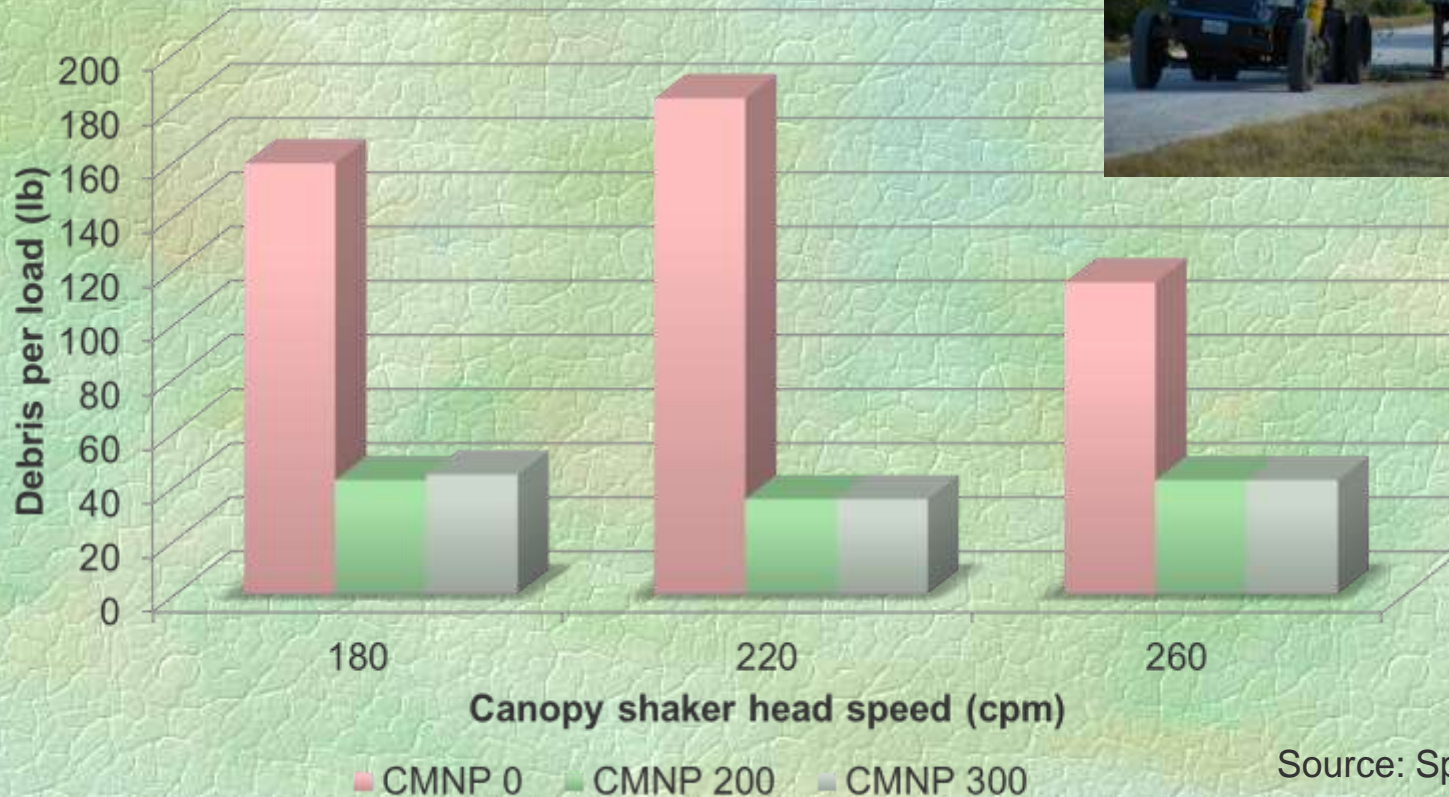


HARVEST EFFICIENCY AND OTHER ADVANTAGES



- Trees treated with CMNP have less debris (leaves and branches) in the trailer loads

Debris per load



HARVEST EFFICIENCY AND OTHER ADVANTAGES

- Will aid gleaning



Best Management Practices



- CMNP application considerations
 - ❖ Requires full canopy coverage
 - ❖ Maximum label rate: 300 ppm at 300 gal/acre.
 - ❖ Requires adjuvant: Activator 90 (alkylphenol ethoxylate, alcohol ethoxylate and free fatty acids) at 0.55 mg L⁻¹.
 - ❖ Loosening occurs for up to 5 days after application under optimal conditions
 - ❖ Loosening consistent throughout the harvest season
 - ❖ Does not cause phytotoxicity of leaves, flowers, or the newly developing 'Valencia' fruit. Does not cause the abscission later to form on the newly developing fruit.
- Effect of environmental factors
 - ❖ Avoid rain 24 hr after application
 - ❖ Loosening is delayed by temperatures < 20°C, but this occurs predictably and can be managed
 - ❖ Drought stress has no effect on loosening
 - ❖ Drying rate not a factor affecting efficacy
- Cultivar and Rootstock: No evidence of strong differences

Best Management Practices



Harvest considerations

- Canopy shakers settings:
 - ❖ Lower canopy shaker head speeds
 - ❖ Faster tractor speeds
- Harvest advantages:
 - ❖ Increases removal to > 90% of entire crop
 - ❖ Less injury to canopy
 - ❖ Less trash in trailer
- Other considerations
 - ❖ Harvest scheduling needs to consider fruit drop, but this can be managed
 - ❖ Fruit quality is not affected as the fruit moves from tree to juice plant



Paul Smith