



# Making mass harvesters more productive with an abscission agent

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# Two types of mechanical harvesters are operating in Florida today



**Trunk Shake and Catch**



**Continuous Canopy Shake and Catch**



*'tractor-drawn' canopy shaker*

**The tractor-drawn canopy shaker is also being used commercially in Florida.**




**Fruit are dropped to the ground and recovered by a hand 'gleaning' crew.**





**Fruit removal with mass harvesters is very good.**

**With an abscission agent, fruit removal will improve.**

-  **CMNP is a selective abscission agent**  
- only loosens mature fruit
-  **Can harvest 3 to 5 days after application**
-  **Easier fruit removal means**  
- faster harvesting  
- successful late season harvest

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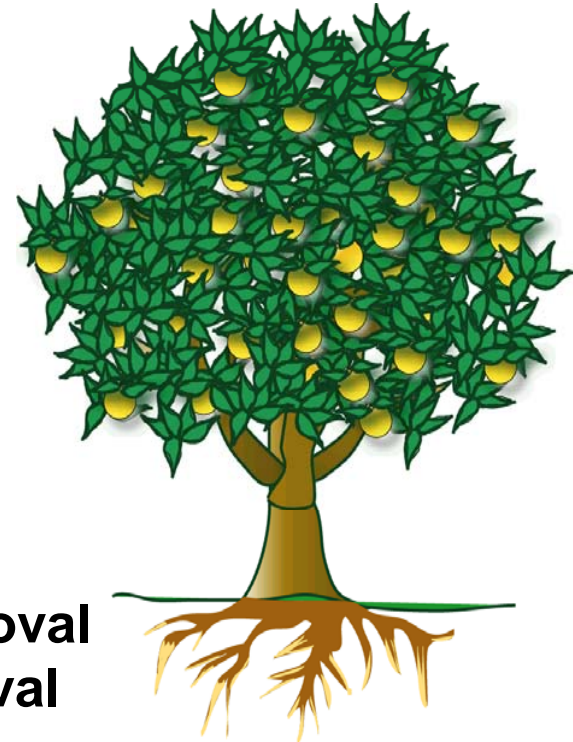
## **Abscission increases speed of mechanical harvesting**

### **Requirements:**

**'selective' abscission agent  
high volume application  
average force MH**

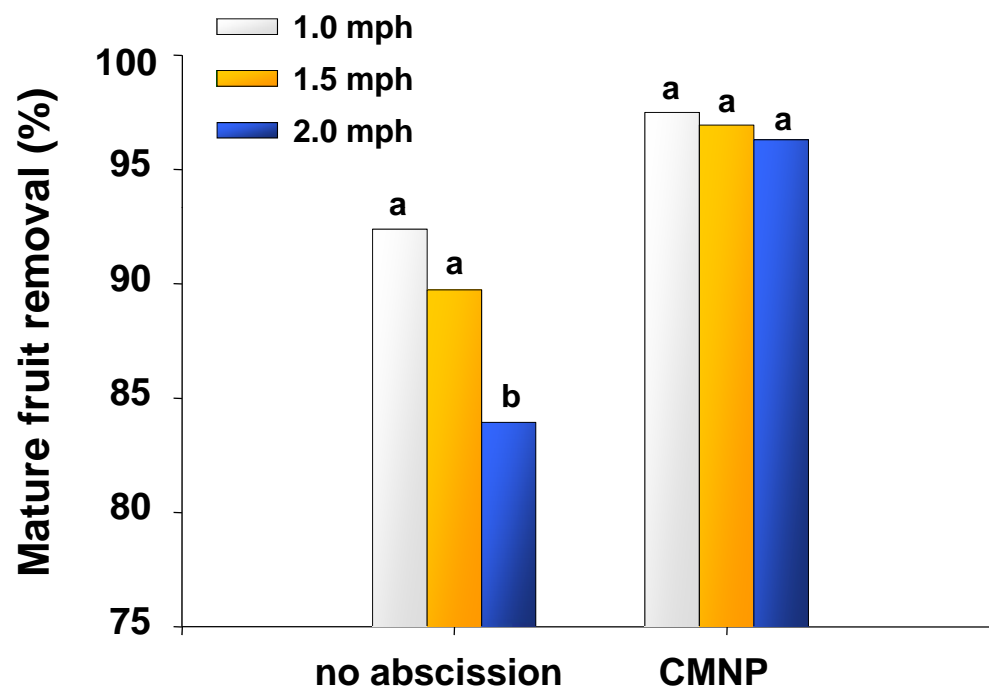
### **Outcomes:**

**excellent uniform mature fruit removal  
2-4-fold increase in speed of removal  
increased harvesting capacity**





## Abscission increases speed of mechanical harvesting



**Increasing MH capacity:**

**More fruit removed  
in the same time period  
(a day, a month, a season)**

**Canopy shaker harvest  
April 19, 2004**

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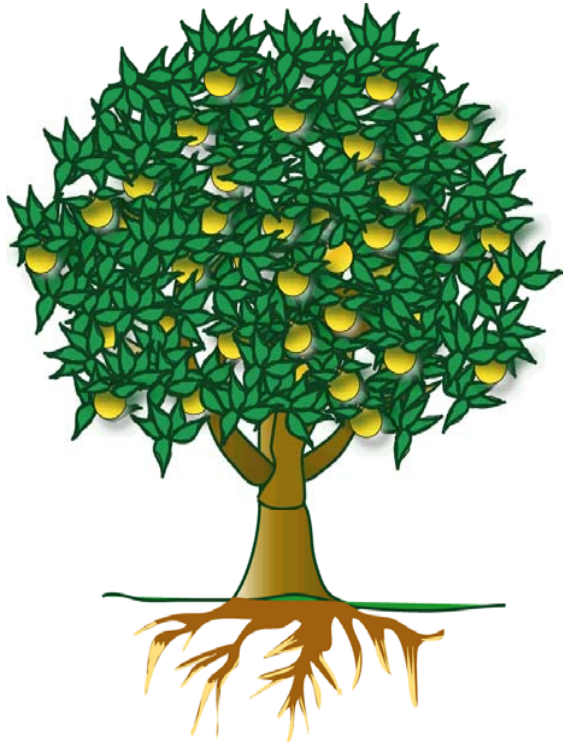
# Removing the impediment to late season harvest

## *The problem:*

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- ~30% Valencia acreage remains to be harvested after May 1
  - processors: fruit delivered into June
- Mechanical harvesting past May 1<sup>st</sup> reduces yield the next season by as much as 50%





## **Abscission makes late season mechanical harvesting a success**

### **Requirements:**

**'selective' abscission agent  
high volume application  
low force MH**

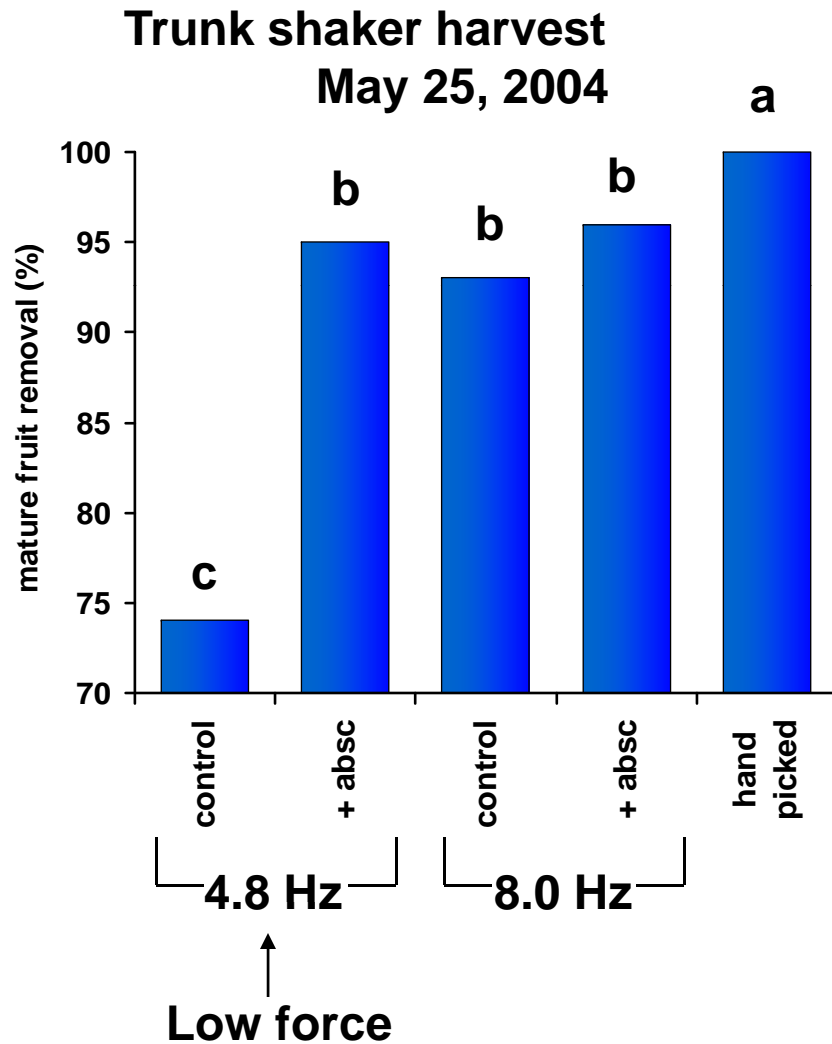
### **Outcomes:**

**excellent mature fruit removal  
low immature fruit removal  
little yield reduction the next year**



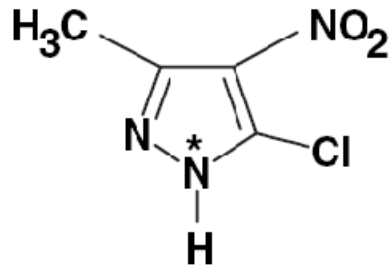


## Late season Valencia mechanical harvesting a reality with low force + CMNP





## What is CMNP, and what are the consequences of its application?



5-chloro-3-methyl-4-nitro-1H-pyrazole  
aka 'CMNP'

- Harvest 3-5 days after application
- Peel injury on blossom end
- Injury restricted to flavedo



*Valencia treated with 250 ppm  
CMNP, 5 days after application*



## Juice quality and CMNP

Canopies were sprayed with CMNP, harvested 5 days after application, then held 5 days at 70°F

<b>cult, date</b>	<b>treatment</b>	<b>% juice</b>	<b>% acid</b>	<b>Brix</b>	<b>Ratio</b>
Hamlin	control		0.7	12.9	18.4
1/12/2003	250 ppm CMNP		0.7	12.9	18.4
Valencia	control	52.4	0.7	14.1	20.1
3/22/2002	250 ppm CMNP	52.5	0.7	14.2	20.3
Valencia	control	48.2	0.6	17.6	29.3
5/25/2002	250 ppm CMNP	47.5	0.6	16.7	27.8



## **Fractions and residues**

**Harvest 3-5 days after application**

**CMNP penetrates no further than the peel**

**CMNP rapidly metabolized to inactive compounds**

**The FDOC actively engaged in registration of CMNP**

- **Studies that determine residues in fractions are among the first conducted**
- **If significant 'red-flags' are indicated, registration will be abandoned**
- **If this occurs, UF/IFAS has additional abscission candidates to pursue**



# Path and Timeline to CMNP Registration

