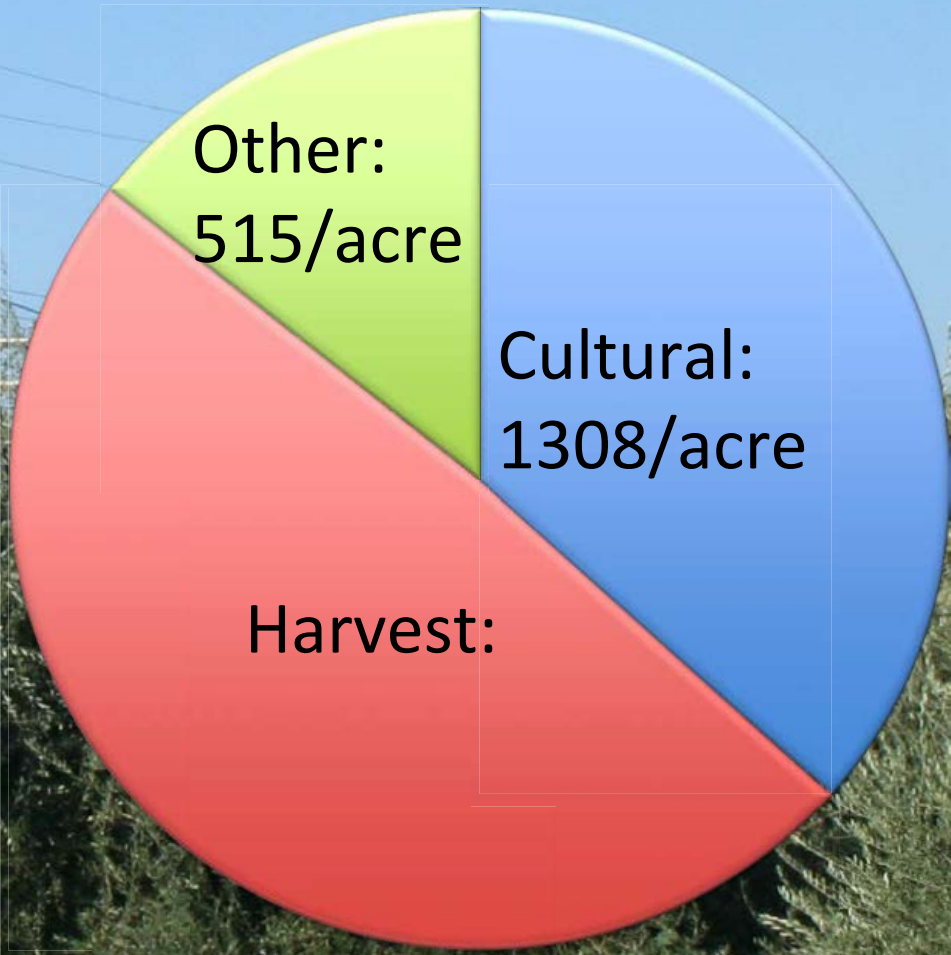
Mechanical Harvesting California Table Olives 2006 - 2011

JA Miles, UA Rosa, S.Castro-Garcia, W.H. Krueger
EJ Fichtner, NV O'Connell, SM Lee, JX Guinard
K Klonsky, PM Vossen, L Ferguson

California Black Ripe

Traditional Orchards: 96-139 trees/

urn



ISHS Mechanical Harvesting Fruits and Nuts April 2-4. 2012

- Dr. Yoav Sarig: "Any horticultural crop that is not mechanically harvested is no longer globally competitive."


Tree
Training
and
Pruning
Harvester

Limiting Factors

- Marketable olives consumers accept
- No long term damage to tree health
  - Mechanical
  - Pathological
- Efficient Enough to be Economically viable


Harvester

California

Trunk shakers

Canopy contact

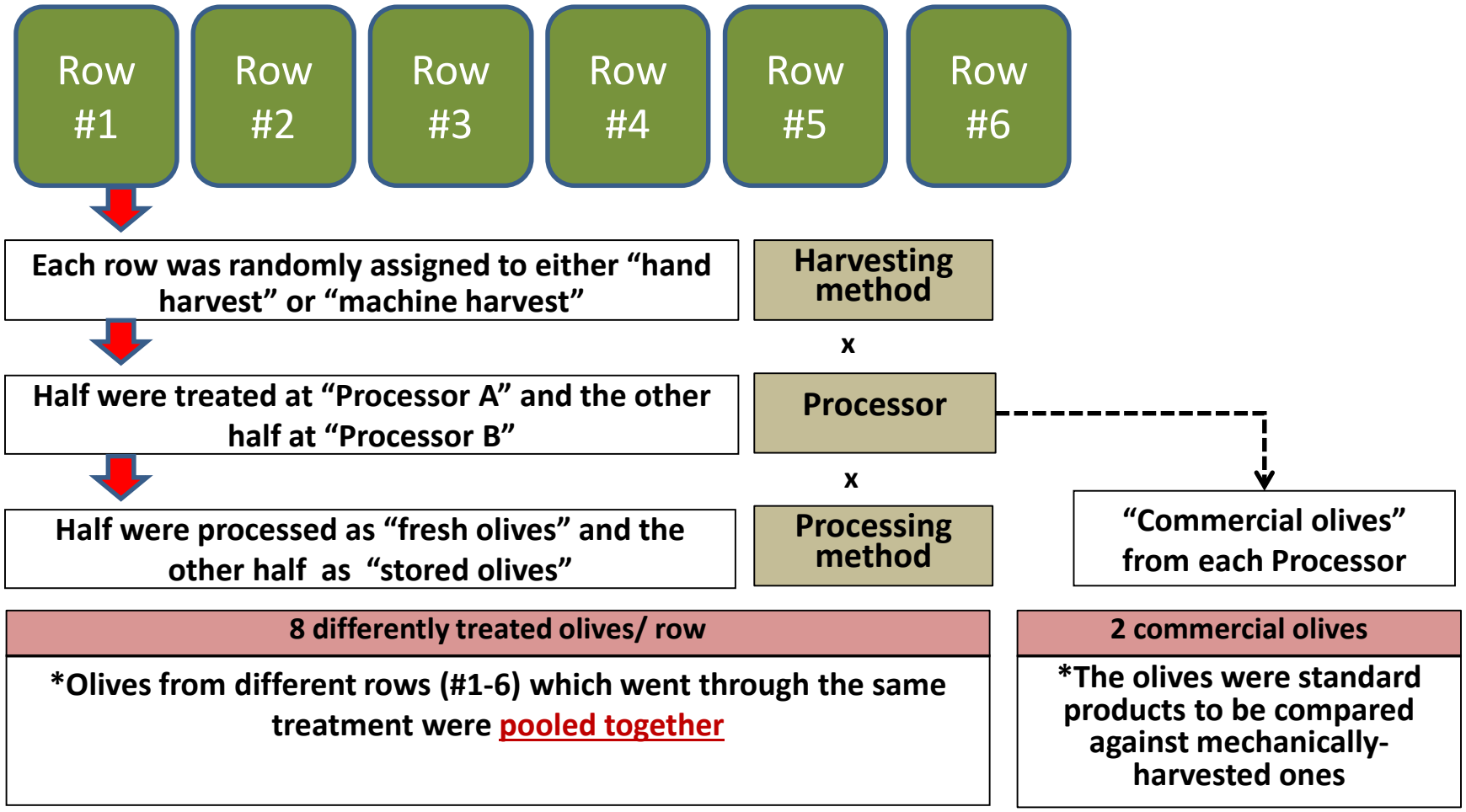
Limiting Factors

- Marketable olives consumers accept:

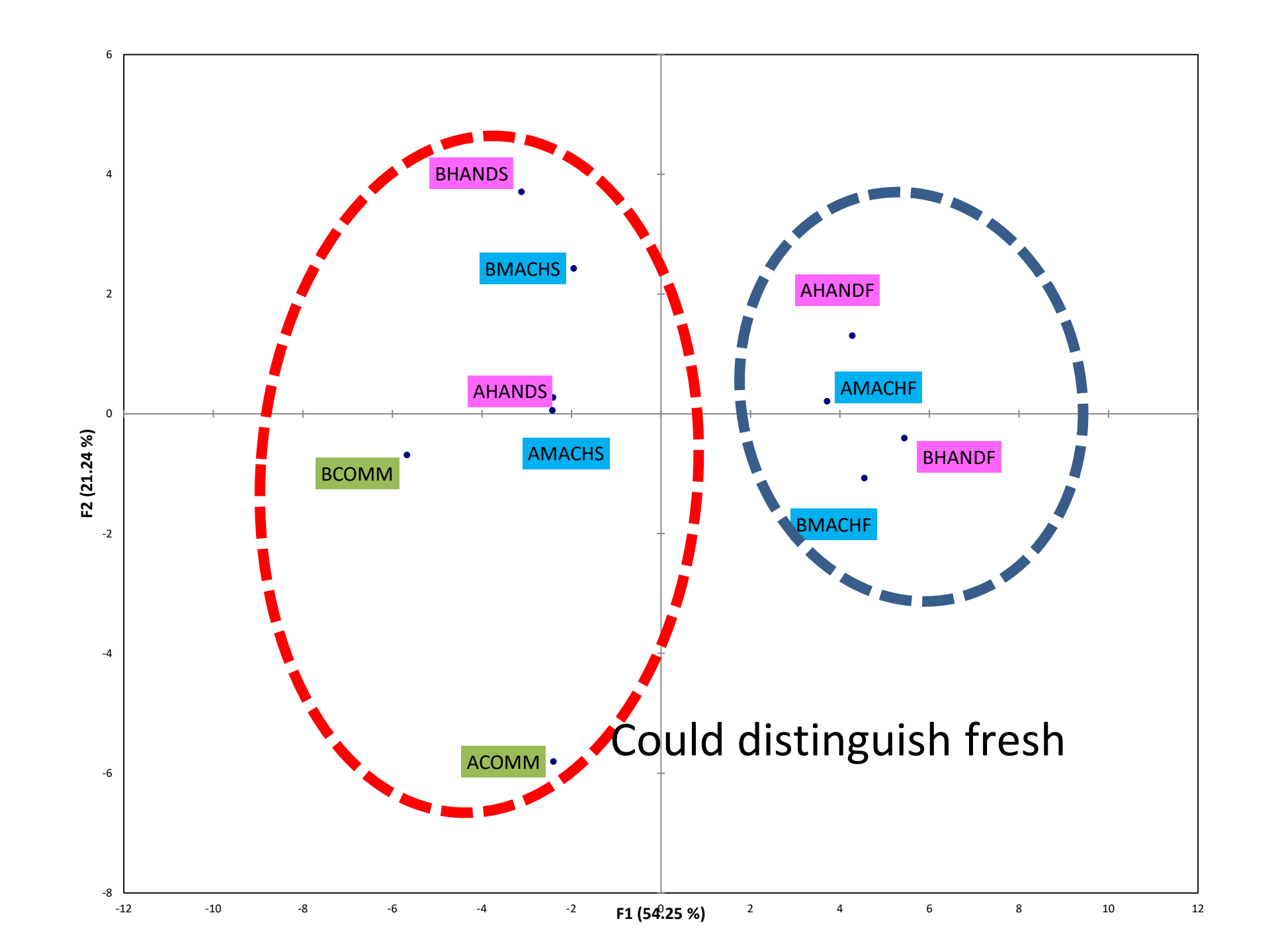
Eliminated based on receiving station grades

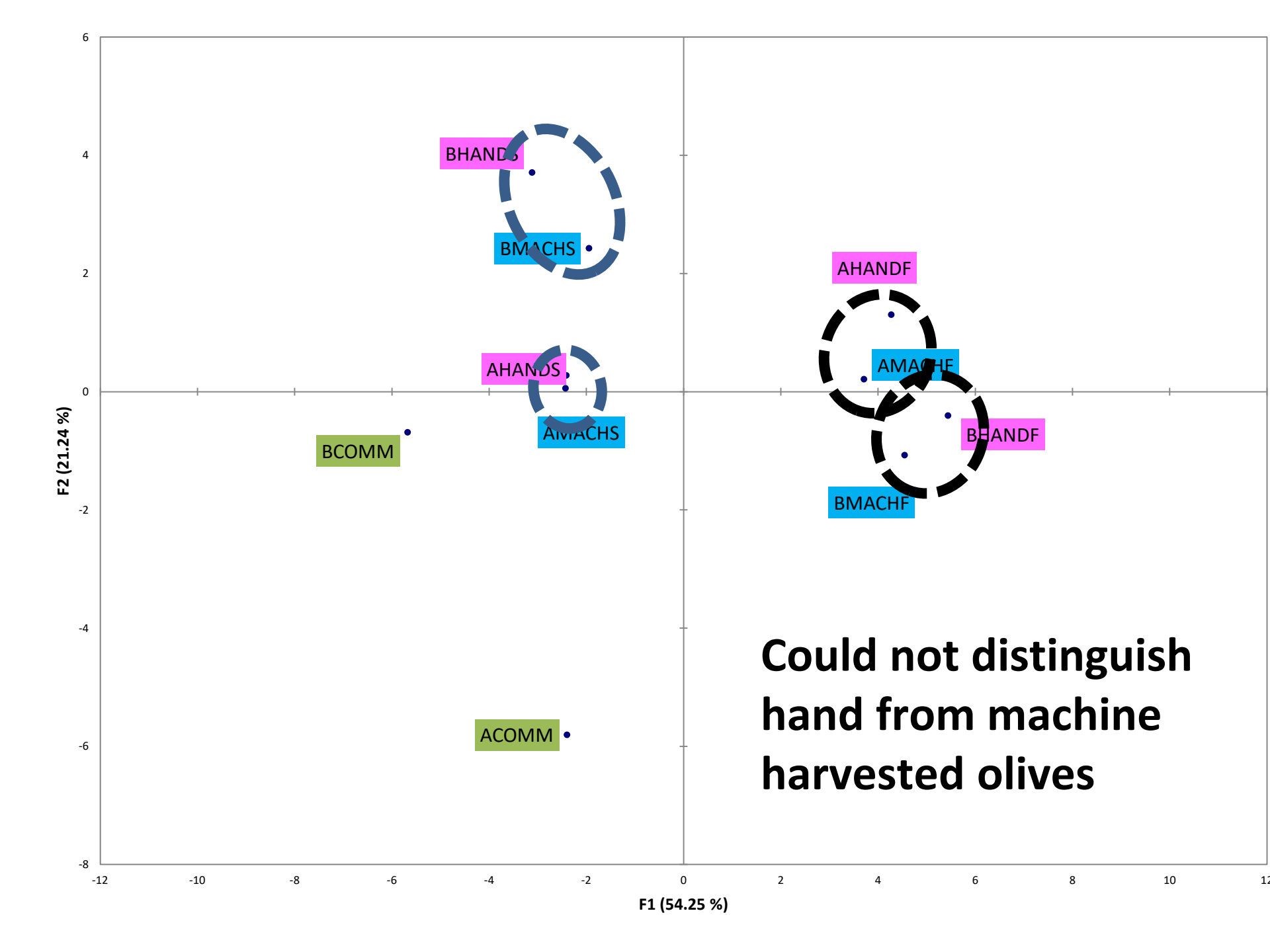
- Confirm with sensory and consumer evaluations

Experimental Harvests



Trained a sensory panel


BHANDS
BMACHS
AHANDS
AMACHS
BCOMM
ACOMM
AHANDF
AMACHF
BHANDF
BMACHF
Could distinguish fresh
F2 (21.24 %)
F1 (54.25 %)
6
4
2
0
-2
-4
-6
-8
-12
-10
-8
-6
-4
-2
0
2
4
6
8
10
12


BHANDS
BMACHS
AHANDS
AMACHS
BCOMM
ACOMM
AHANDF
AMACHF
BHANDF
BMACHF
Could not distinguish hand from machine harvested olives
F2 (21.24 %)
F1 (54.25 %)
6
4
2
0
-2
-4
-6
-8
-12
-10
-8
-6
-4
-2
0
2
4
6
8
10

UC DAVIS OLIVE CENTER

Taste Test for Black Olives

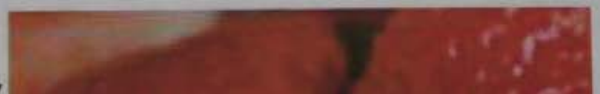
1~ 3 pm

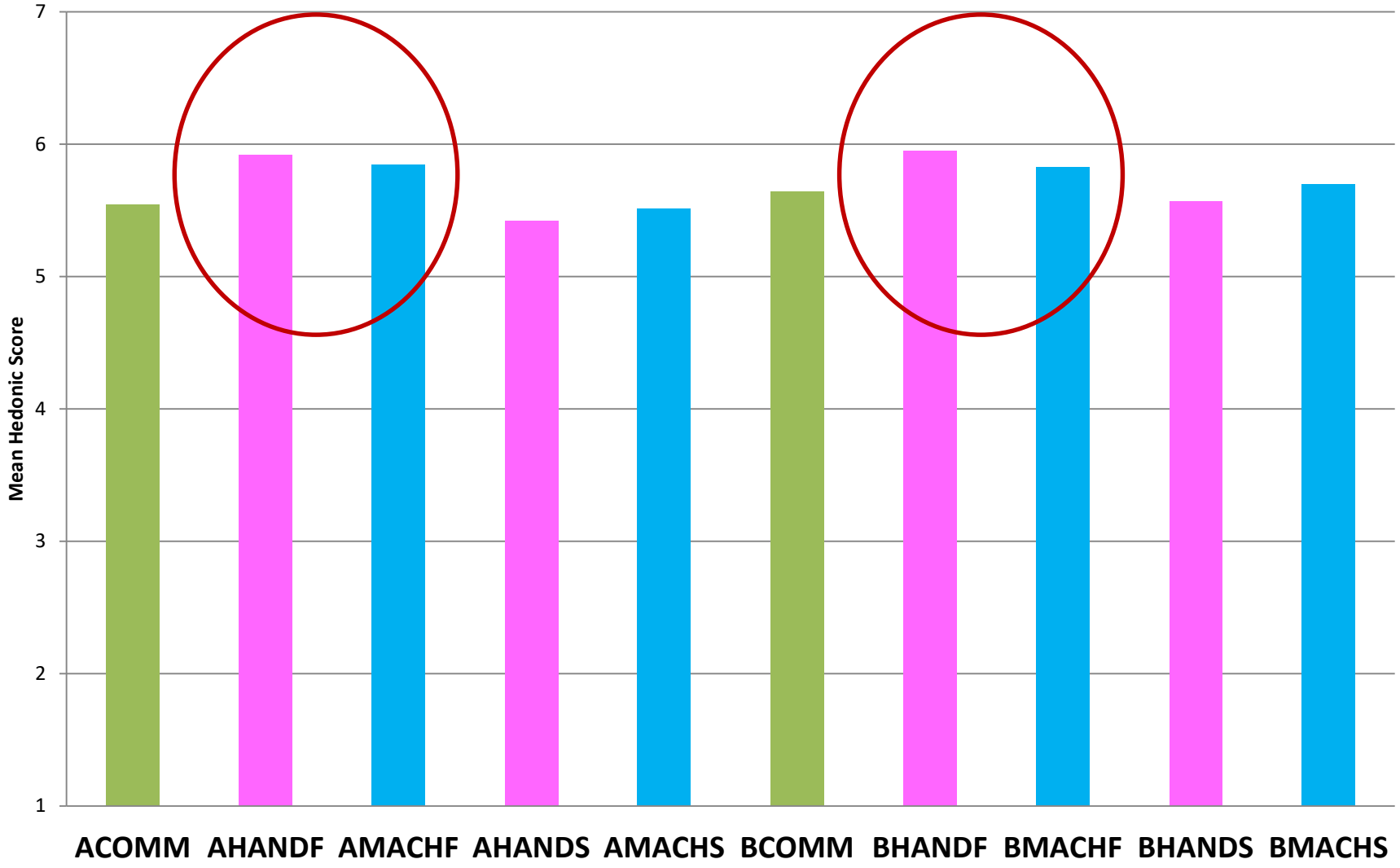
RMI Sensory Rm.1000

Consumer Preference Panels

10 ~ 3 pm

RMI Sensory





Liked machine and hand harvested olives equally well

Limiting Factors

- ✓ Marketable olives consumers accept

Limiting Factors

- No long term effects on tree health


Star
1998


Clamp Strength < 800 PSI


< 1 %

Limiting Factors

- ✓ Marketable olives consumers accept
- ✓ No long term damage to tree health
  - Mechanical +/-
  - Pathological ?

Limiting Factors


Star
1998

Final Harvester Evaluations

- Trunk Shaking (2009, 2010)
- Removes fruit closer to trunk
  - 64% efficient

- Canopy Contact (2008, 2009, 2010)
- Removes more exterior fruit best
  - 68% efficient

Limiting Factors

- ✓ Marketable olives consumers accept
- ✓ No long term damage to tree health
  - ✓ Mechanical =/-
  - ✓ Pathological ?
- ✓ Efficient enough to be economically viable
  - ✓ Not yet


3305
337
Bobcat
Bobcat

Trunk Shakers: imported and domestic

"Harvest method determines tree training." Gucci, 2009

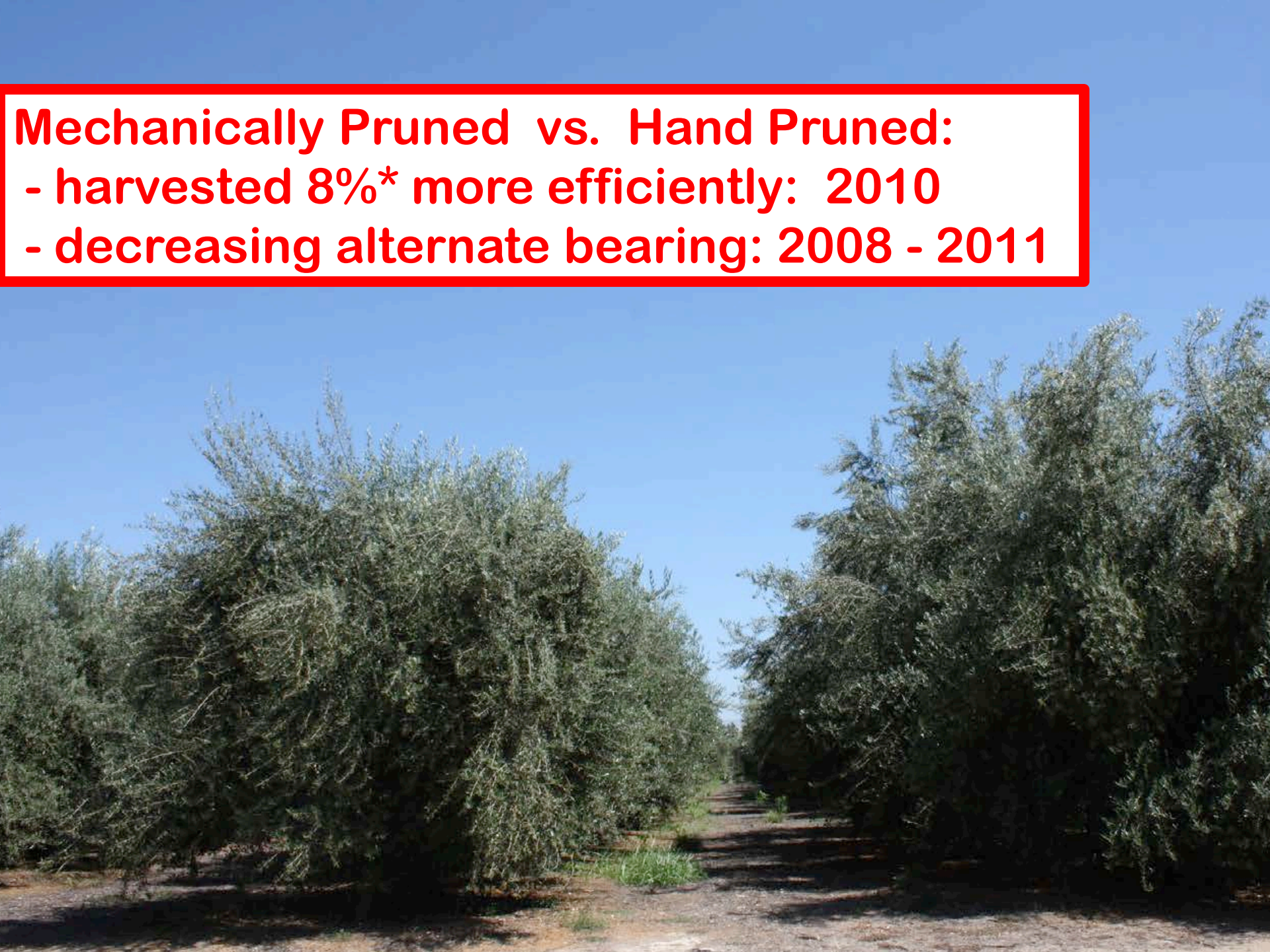

12 feet

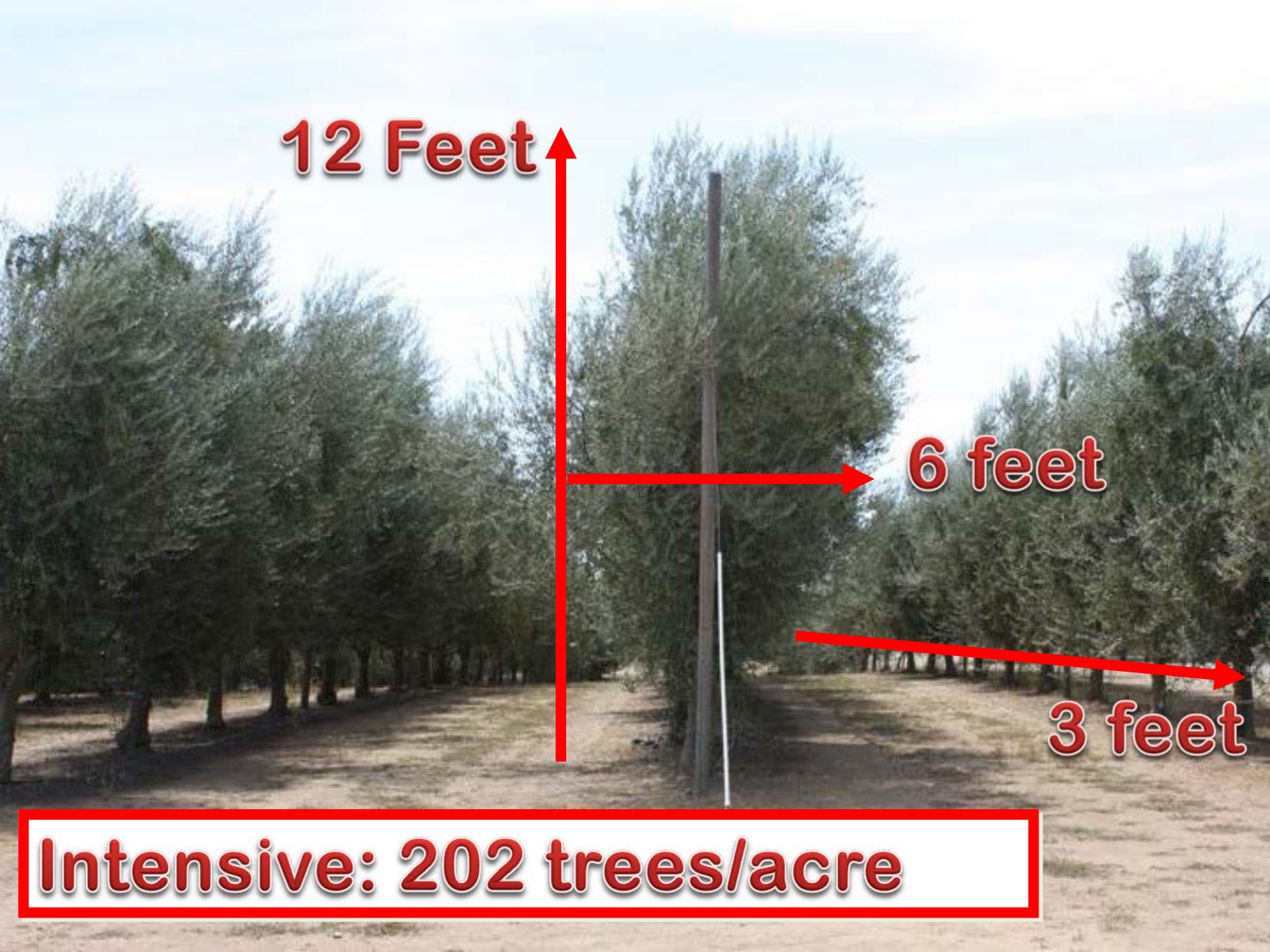

6 feet

Effect of Mechanical Pruning on Yield 2008 – 2011

Pruning	2008	2009	2010	2011	T/A cum	T/A ave.
Mech.	1.34	0.07	6.8	7.3	15.5	**3.9**
	Topped Hedged West	Topped Hedged East	-------	Hedged West		
Hand	1.54	0.18	8.5	2.8	13.0	**3.2**
	NSD	NSD	P = 0.05	P = 0.05		


MP
2009


Mechanically Pruned vs. Hand Pruned:
- harvested 8%* more efficiently: 2010
- decreasing alternate bearing: 2008 - 2011


12 Feet
6 feet
3 feet
Intensive: 202 trees/acre


12 Feet and 2 feet

Mechanical Harvesting Summary

- No longer a significant problems
  - Processed Fruit Quality
  - Tree Damage
- Harvester Efficiency too low
  - Improving machine
  - Improving pruning

Mechanical Harvesting Preparation

- Start pruning trees
  - lower height
  - narrow canopy
- Experimenting with mechanical pruning
- Thin annually