Mechanical Harvesting of California Black Ripe Table Olives

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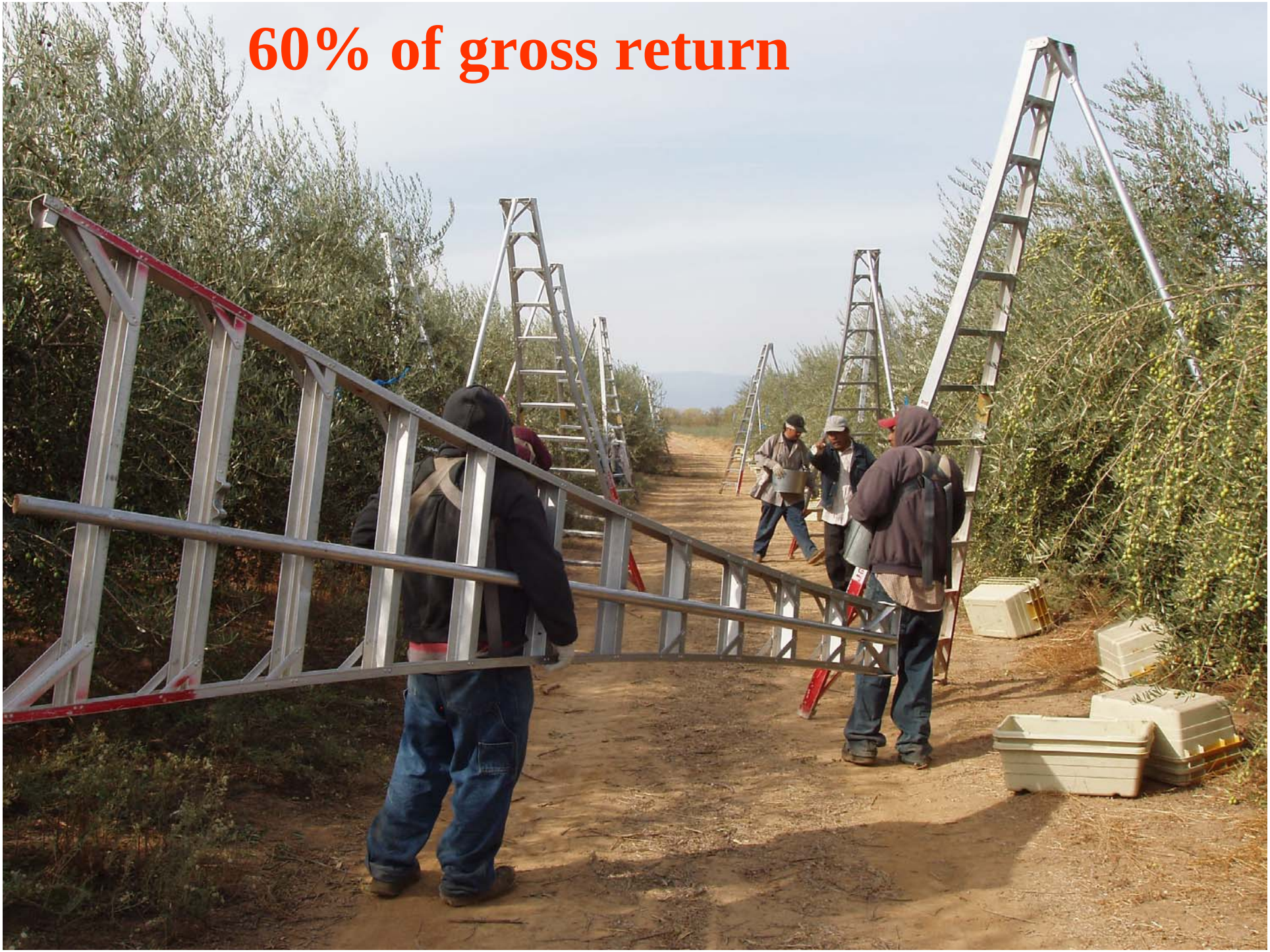
and
Dave and Karen Smith of DSE
Rocky Hill Ranch and Burreson Ranch,
Bell Carter Olives and Musco Family Olive Company
Finca La Bella and MaqTec


60% of gross return

Economically Feasible Mechanical Harvesting

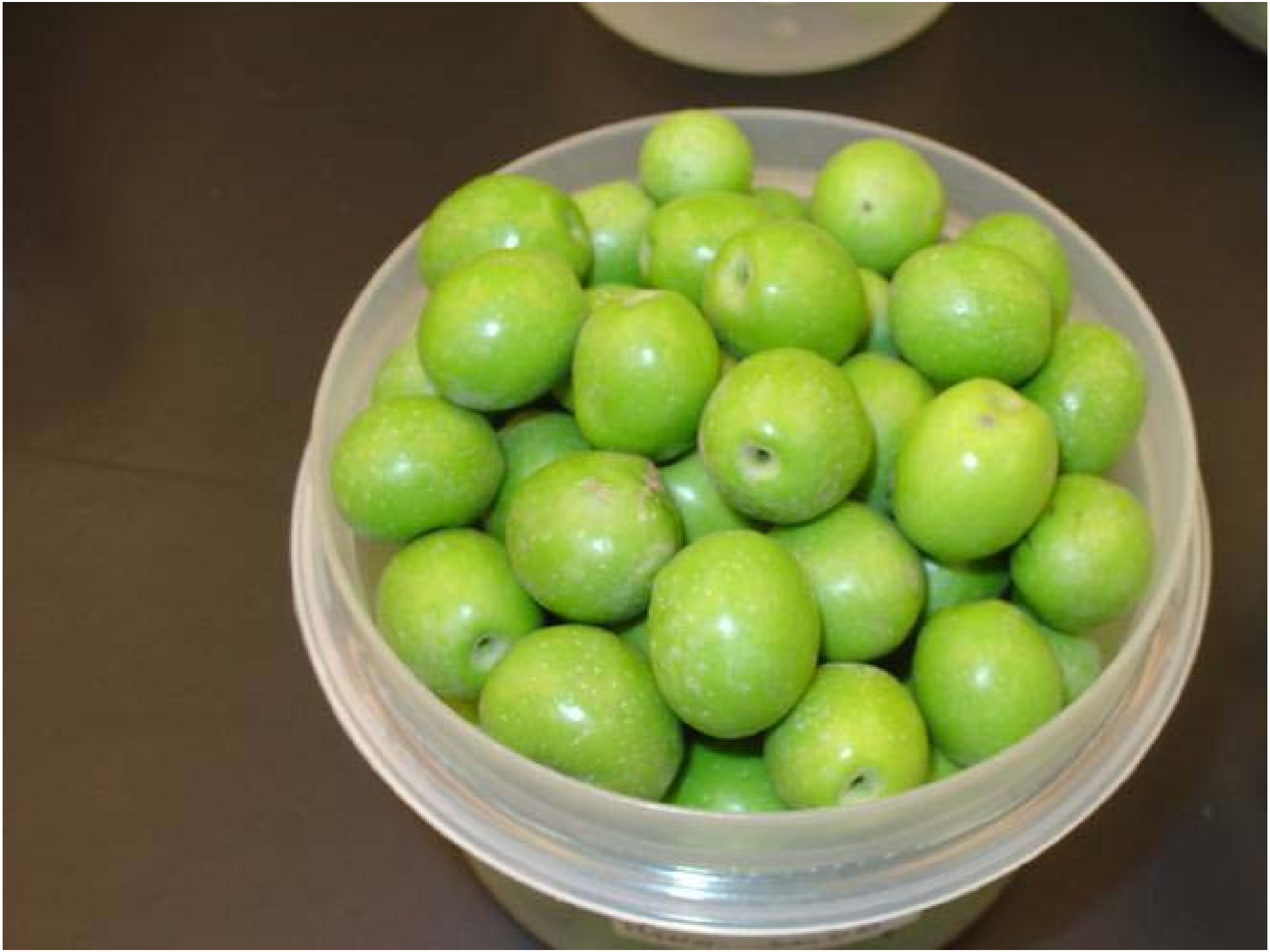
Harvester

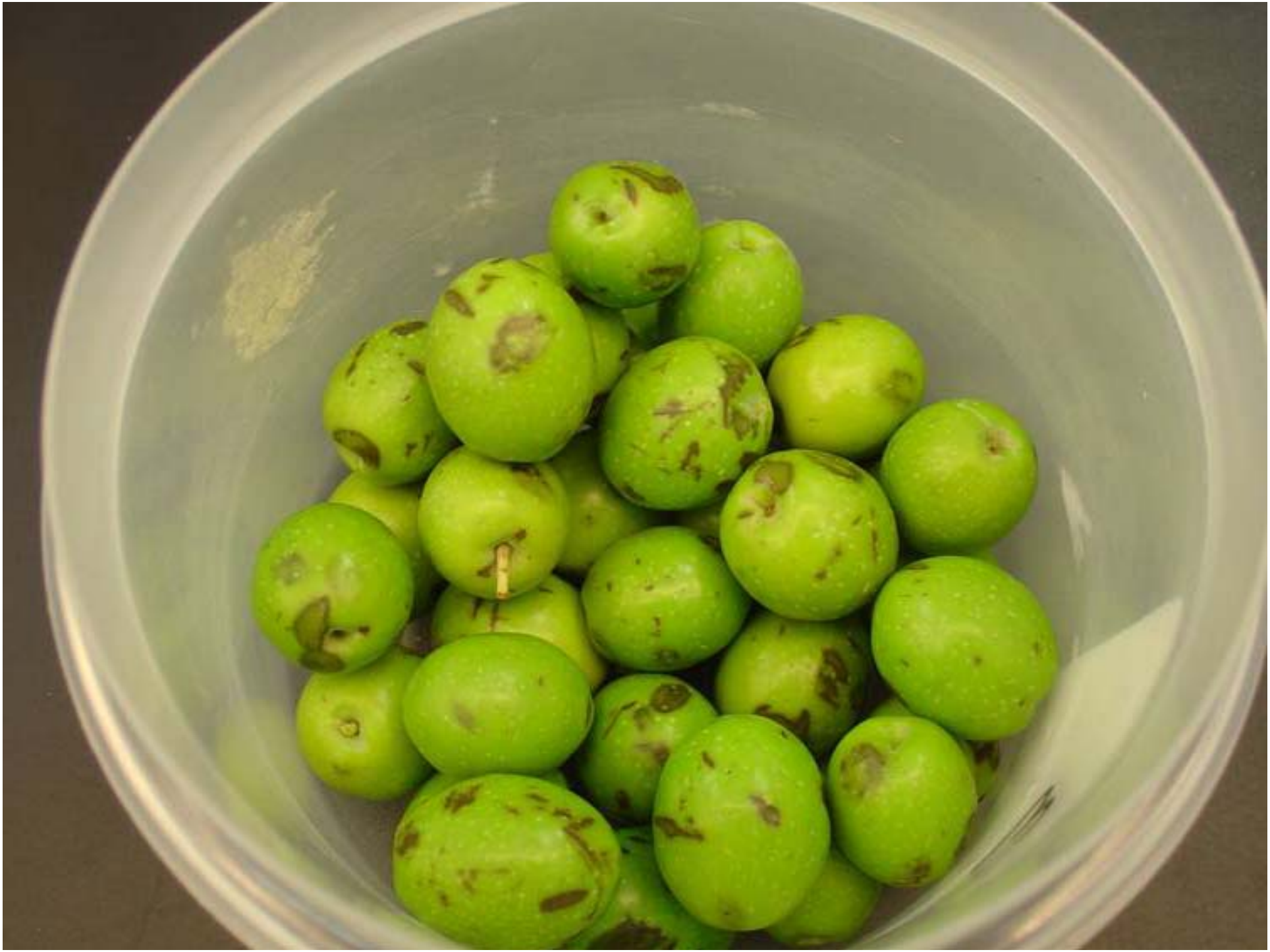
- Efficient
- Fruit Quality
- Decrease FRF
- Abscission Agent
- Training and Pruning
- Postharvest Treatments

Commercially Marketable Processed Olives

2006 Results

- 86% removal
- 67% efficiency
- incompetent catch frame
- fruit accessibility
  - pruning
- fruit detachment
  - abscission

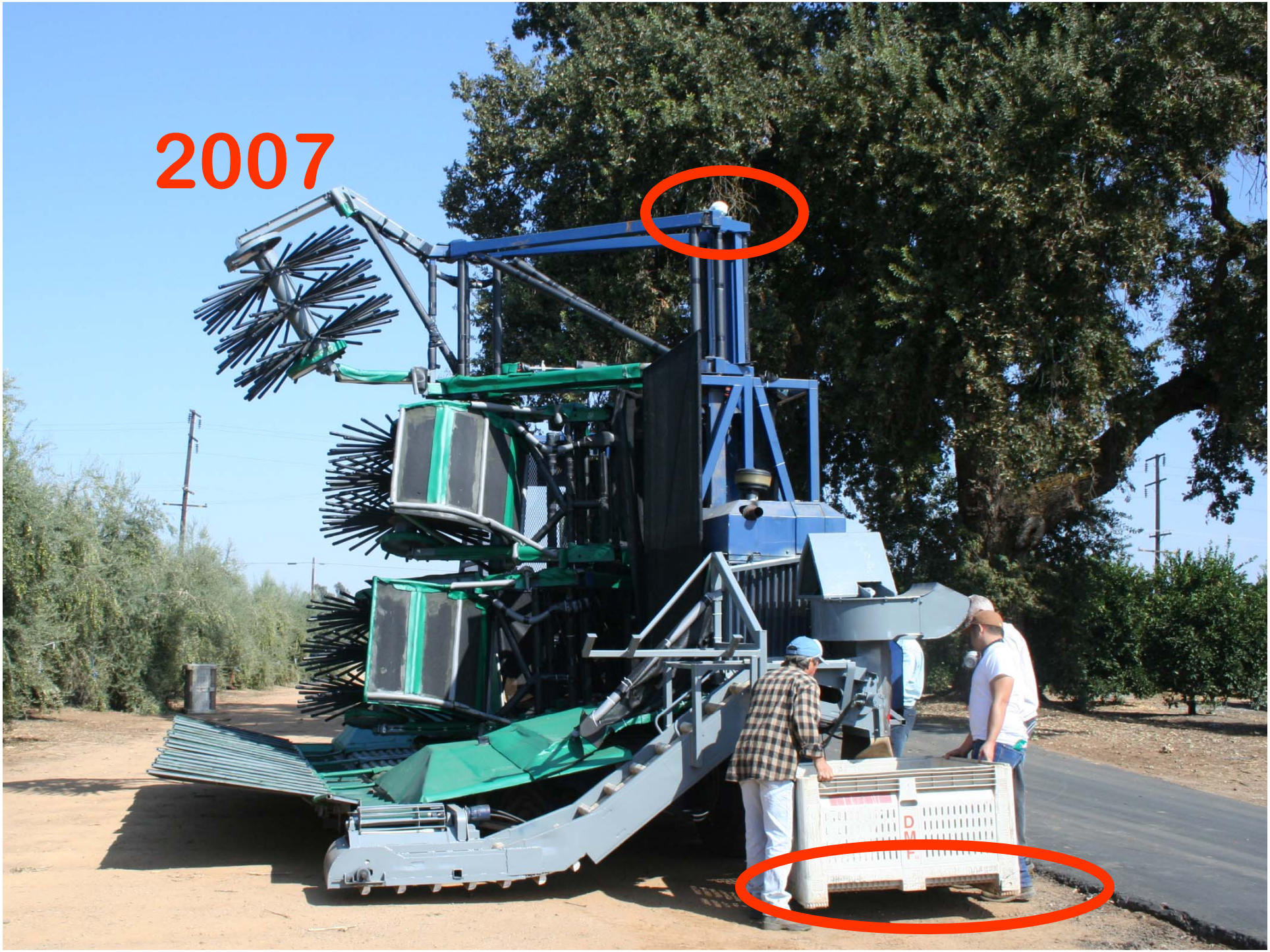


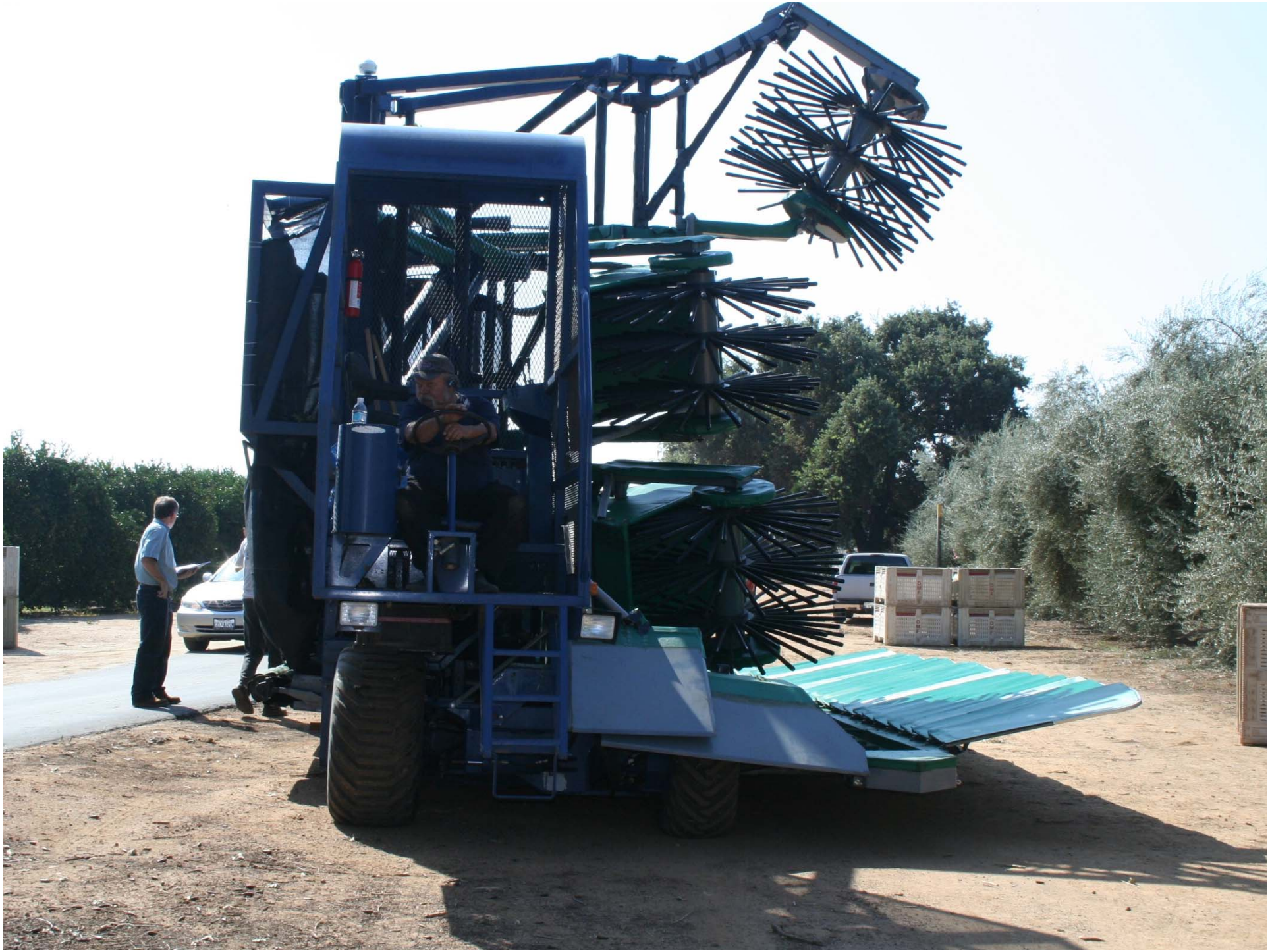


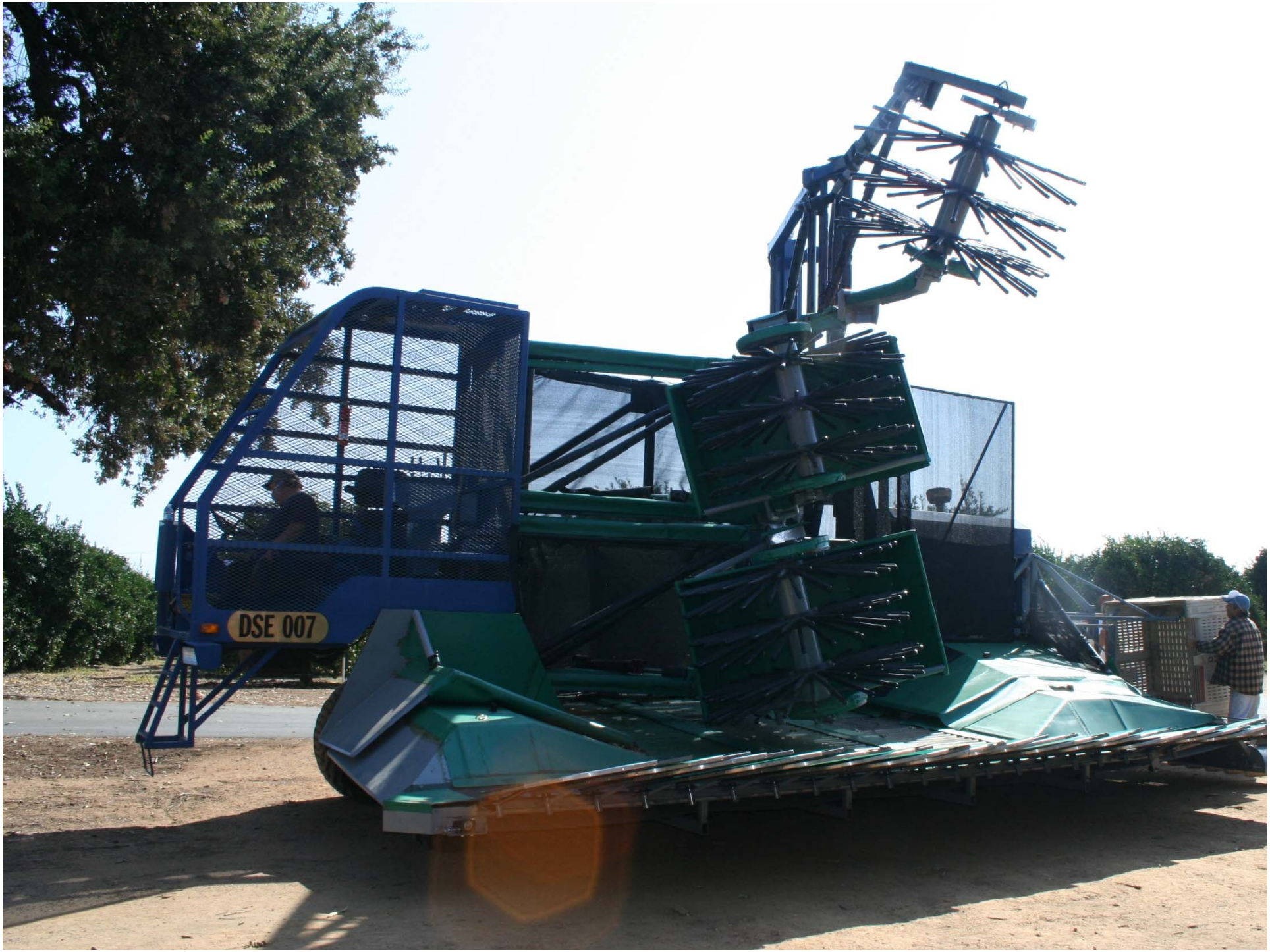
California Black Ripe ‘Manzanillo’

Conclusions: 2006

- Evaluate harvester on
  - Traditional
  - Hedgerow
- Cant upper head angle
- Better padding rods, frame, belts
- Commercial scale processing
- Revaluate delivery grade with consumer acceptability*


2007

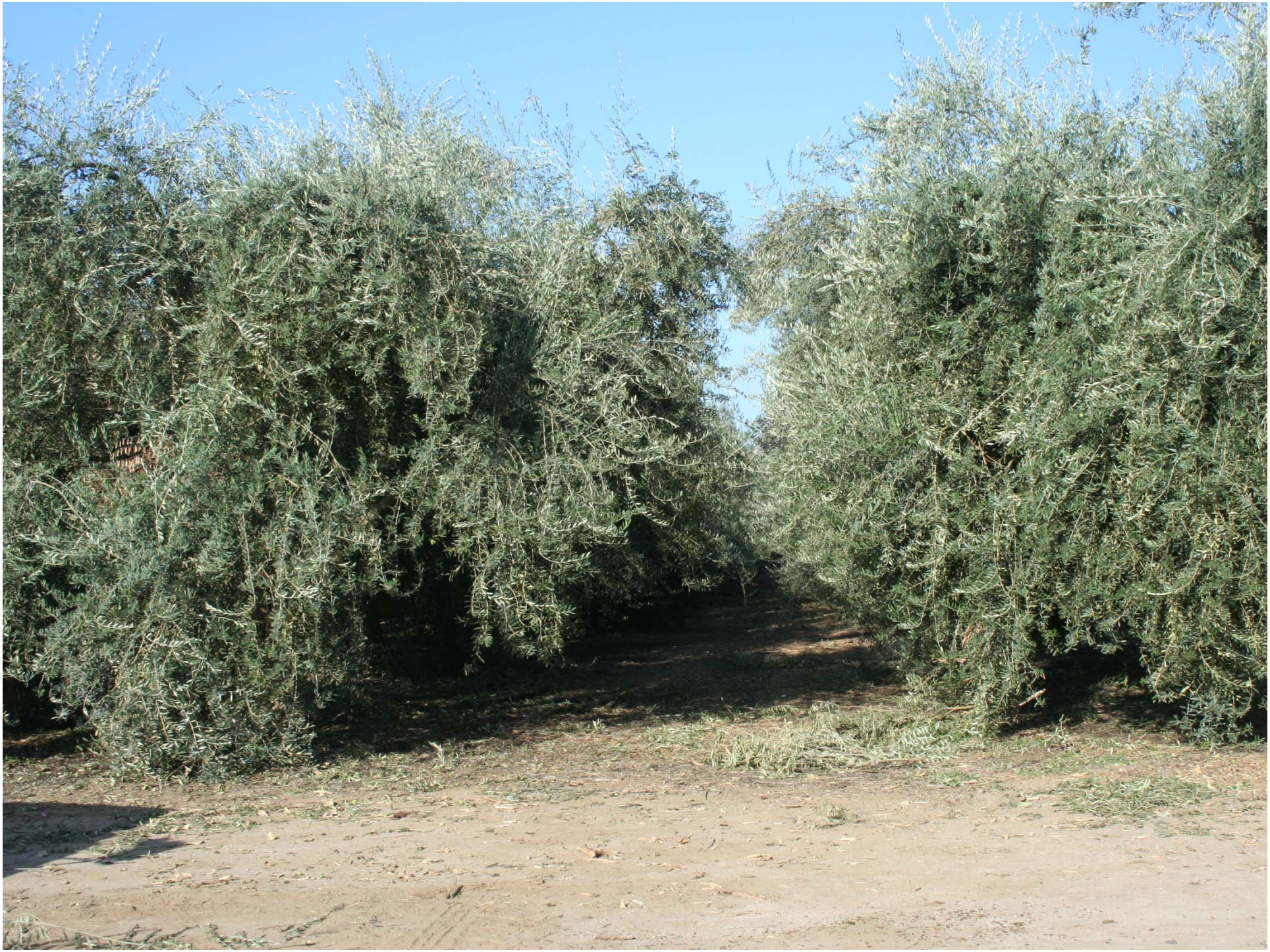



DSE 007

Project Trials: 2007 Season

- **Rocky Hill Ranch Trials:**
- **I. Traditional Orchard:**
  - **24 X 24 diamond planting; 76 trees/a**
- **II. Hedgerow Planting:**
  - **12 X 21; 139 trees/a**

Traditional Pruning: 2007

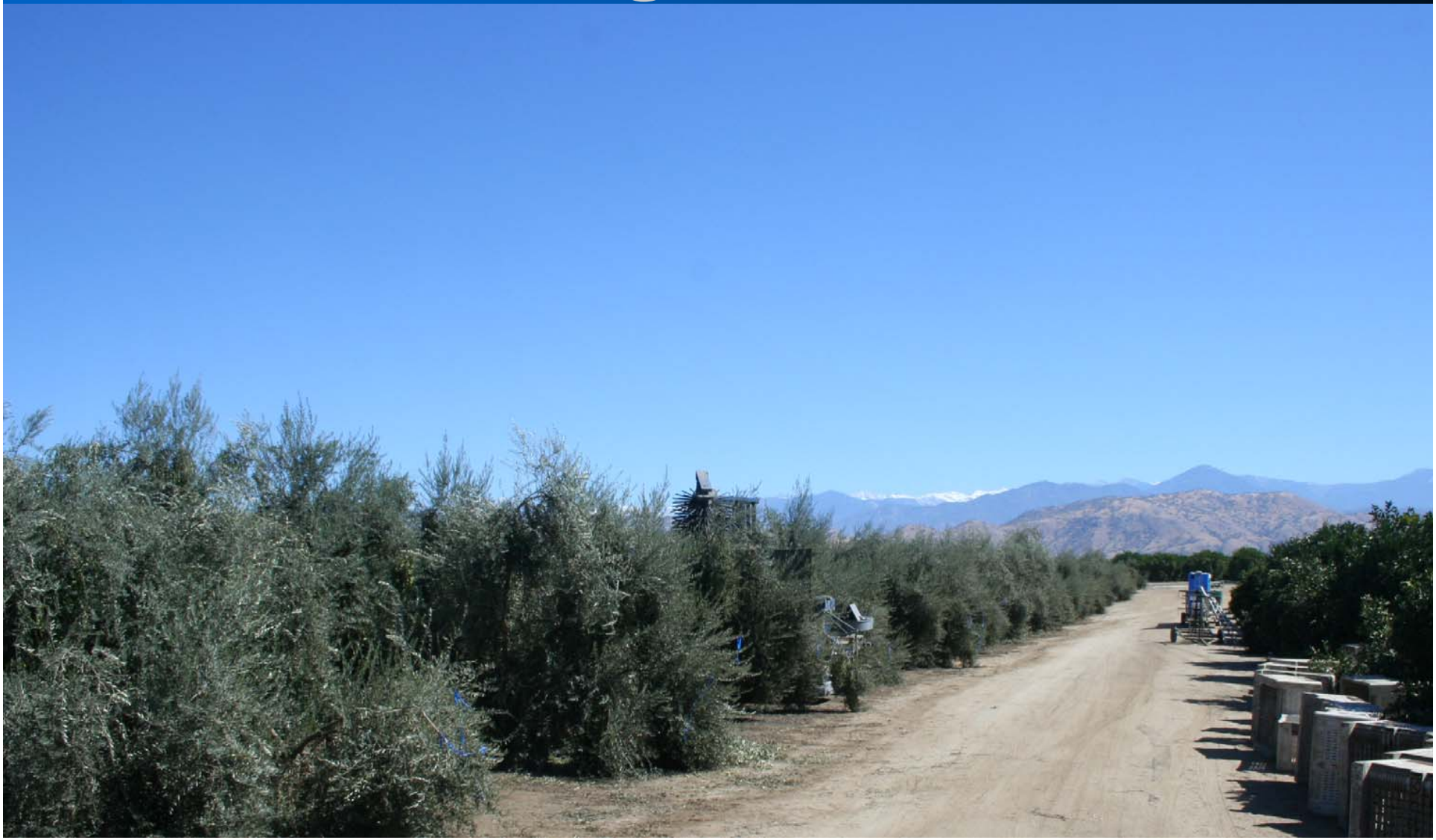


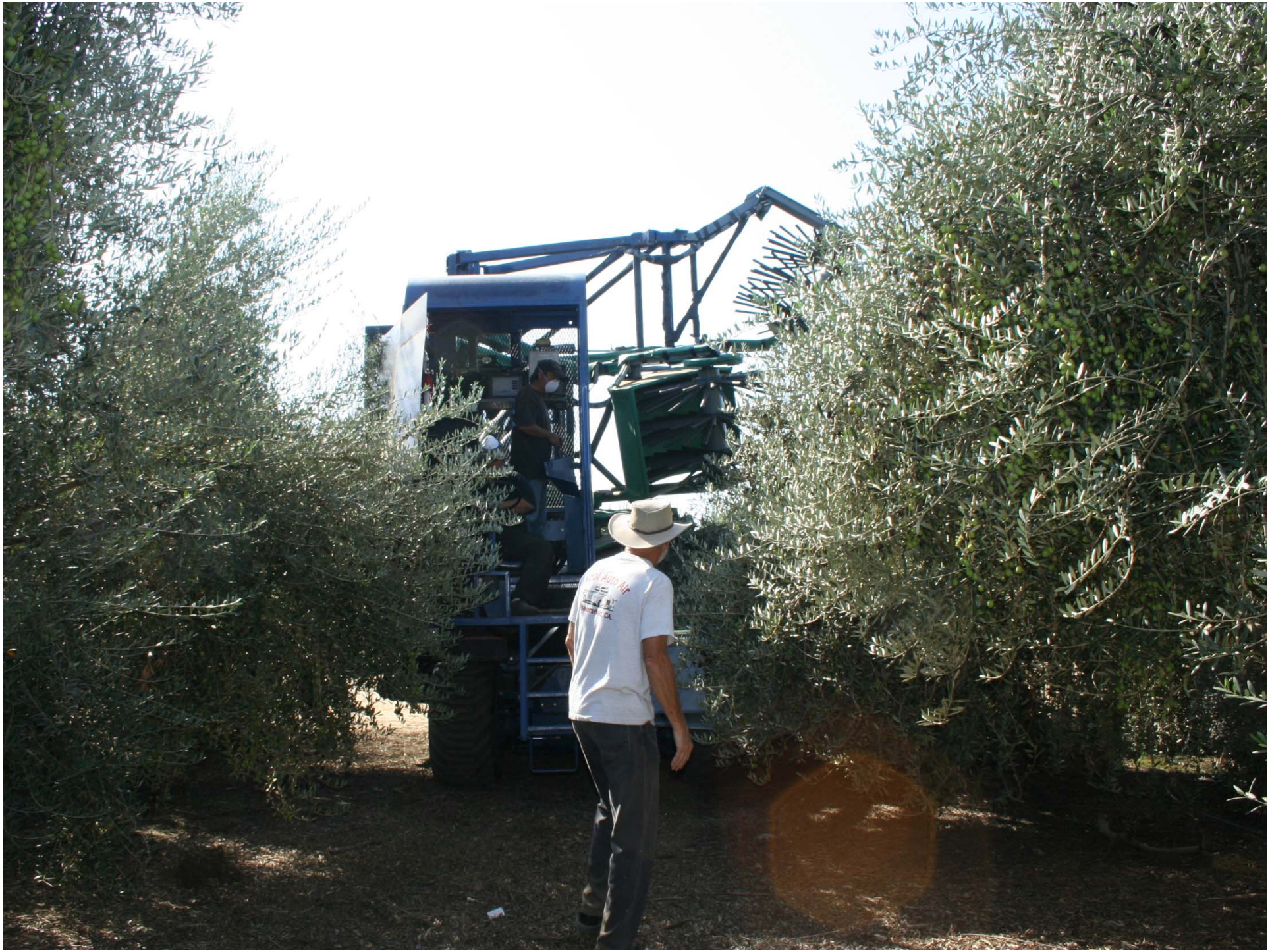

Kool Auto Air
Bakersfield, CA.

2007 Harvest Season

- **Traditional Pruning**
- **11% efficiency**
- **71% value**
- **73% tree damage**

Mature Hedgerow: 2007



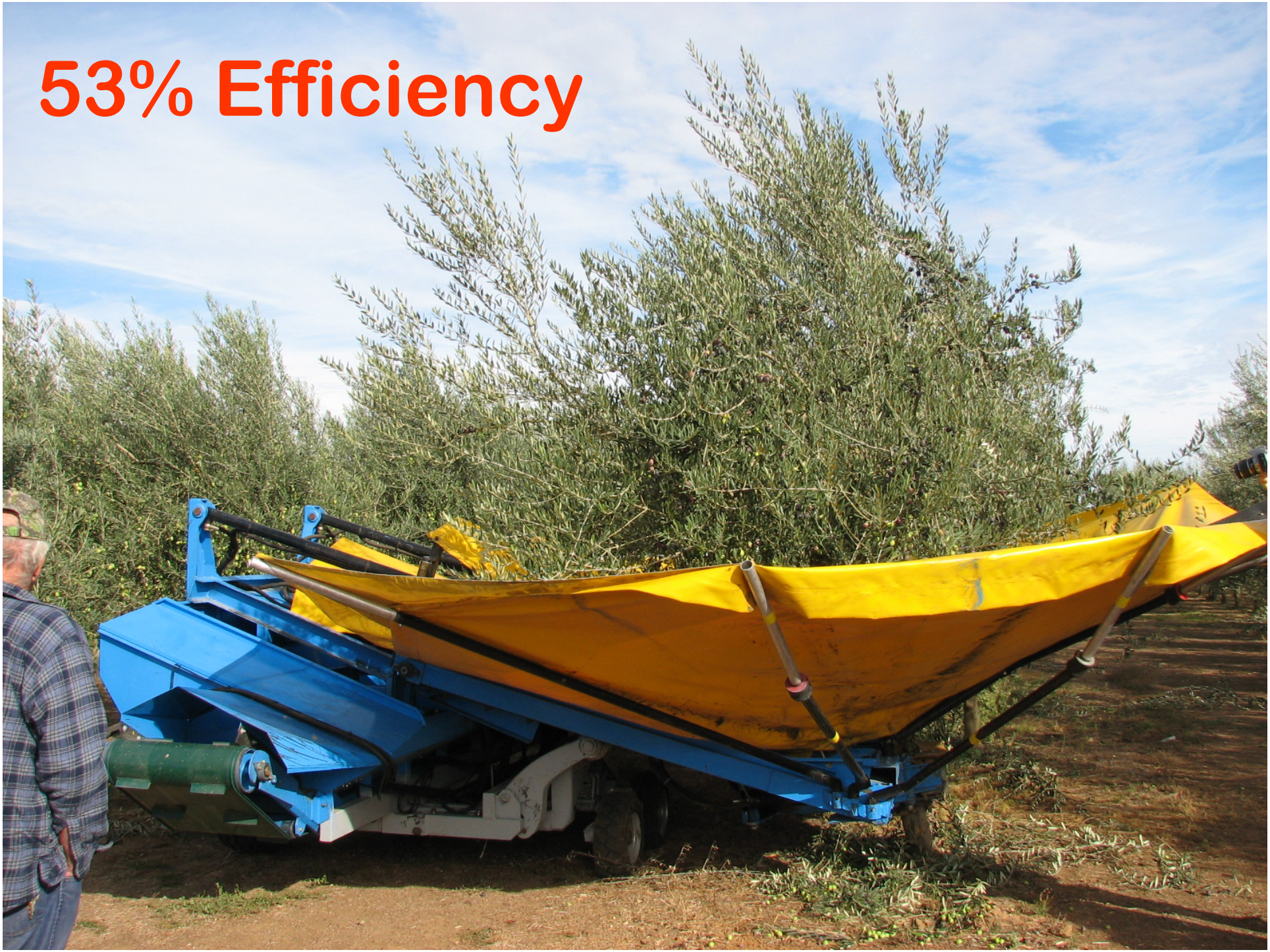


2007 Harvest Season

- **Traditional Pruning**
- **11% efficiency**
- **71% value**
- **73% tree damage**

- **Hedgerow Pruning**
- **81% removal**
- **73% efficiency**
- **1.5 – 2 tons/hour**
- **68 – 93% value**
- **13% tree damage**

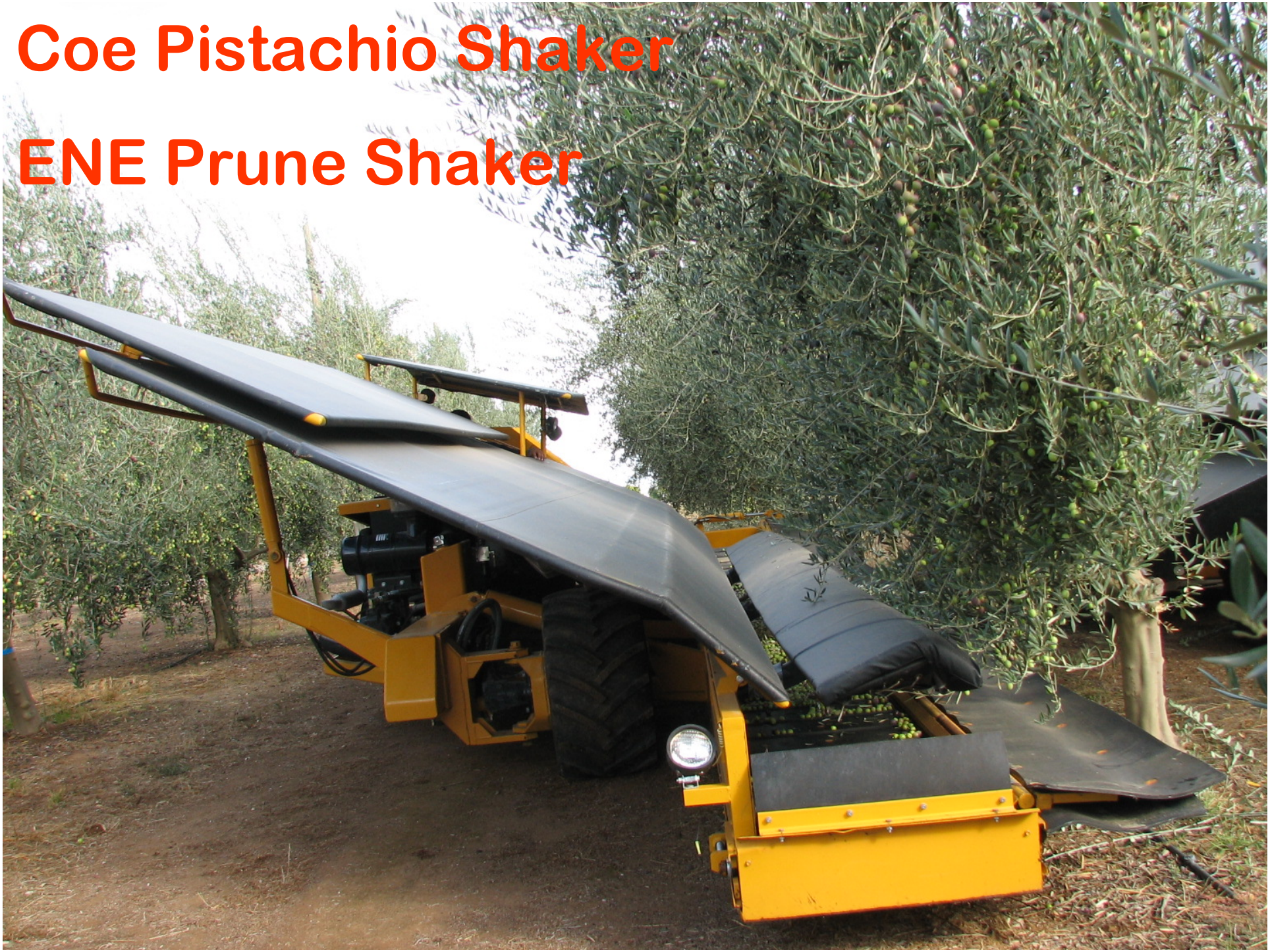
Commercial Lot Processing: 2008


53% Efficiency

Tree Training : 2001 - 2007

Coe Pistachio Shaker

ENE Prune Shaker



Abscission Trials: 2006 & 2007

Screening trials, table olives - Sept Oct 2007

Leaf loss, leaf burn, fruit burn and fruit shrivel subjective ratings:
0-no visual effect; 1-slight; 2-moderate; 3-severe

DATA OVERVIEW - Nichols Estate

application October 14 - measurements October 26, 2007

	FDF (g)	leaf loss	frt burn	% frt drop
4% MPK	297	1.5	0.5	13
2500 ppm ethephon	415	1.8	0	6
2500 ppm ethephon + 4% MPK	99	2.3	0	42
5000 ppm ethephon	151	2.8	0.5	38
5000 ppm ethephon + 4% MPK	56	3	0.3	68
0.1% RNAsi silicon adjuvant	404	0	0.5	3
1X HarvestVant (40 g/L)	376	0.8	0	0
0.5X HarvestVant (20 g/L)	394	0.3	0	5
2 ppm 901	298	0.5	0.3	4
1 ppm 901	264	0.8	0.3	2
0.5 ppm 901	367	0.5	0.5	2
2000 ppm dikegulac 1 (18.5% ai)	421	0	0.3	0
4000 ppm dikegulac 1 (18.5% ai)	332	0	0.5	0
2000 ppm dikegulac 2 (9.45% ai)	222	2	0.5	5
4000 ppm dikegulac 2 (9.45% ai)	142	2.8	0.5	15
2000 ppm dikegulac 3 (4.47% ai)	102	2.5	0.5	18
4000 ppm dikegulac 3 (4.47% ai)	75	3	0.5	45
0.1% dikegulac adjuvant	408	0	0.5	0

Screening trials, table olives - Sept Oct 2007

Leaf loss, leaf burn, fruit burn and fruit shrivel subjective ratings: 0-no visual effect; 1-slight; 2-moderate; 3-severe

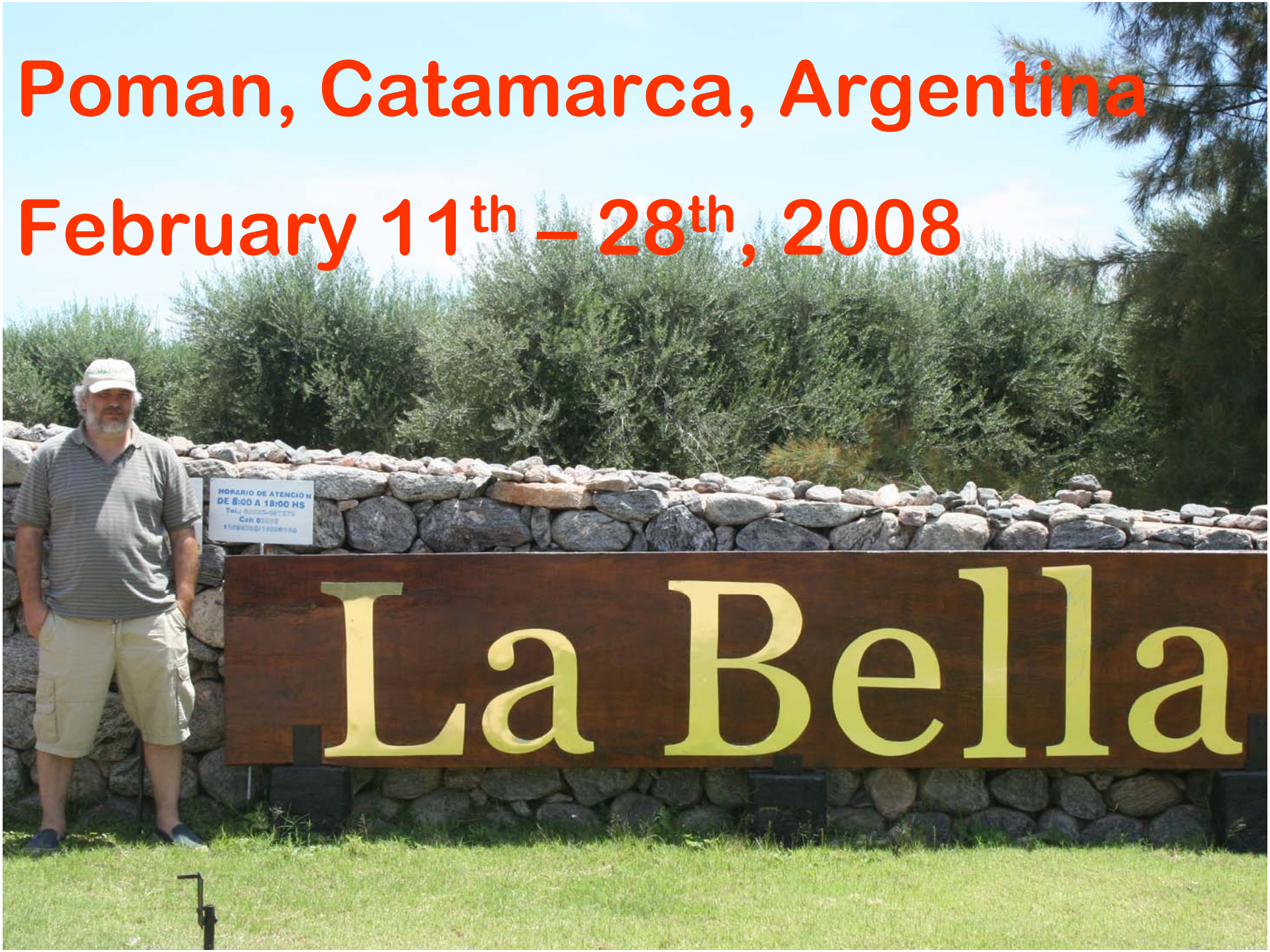
DATA OVERVIEW - Lindcove

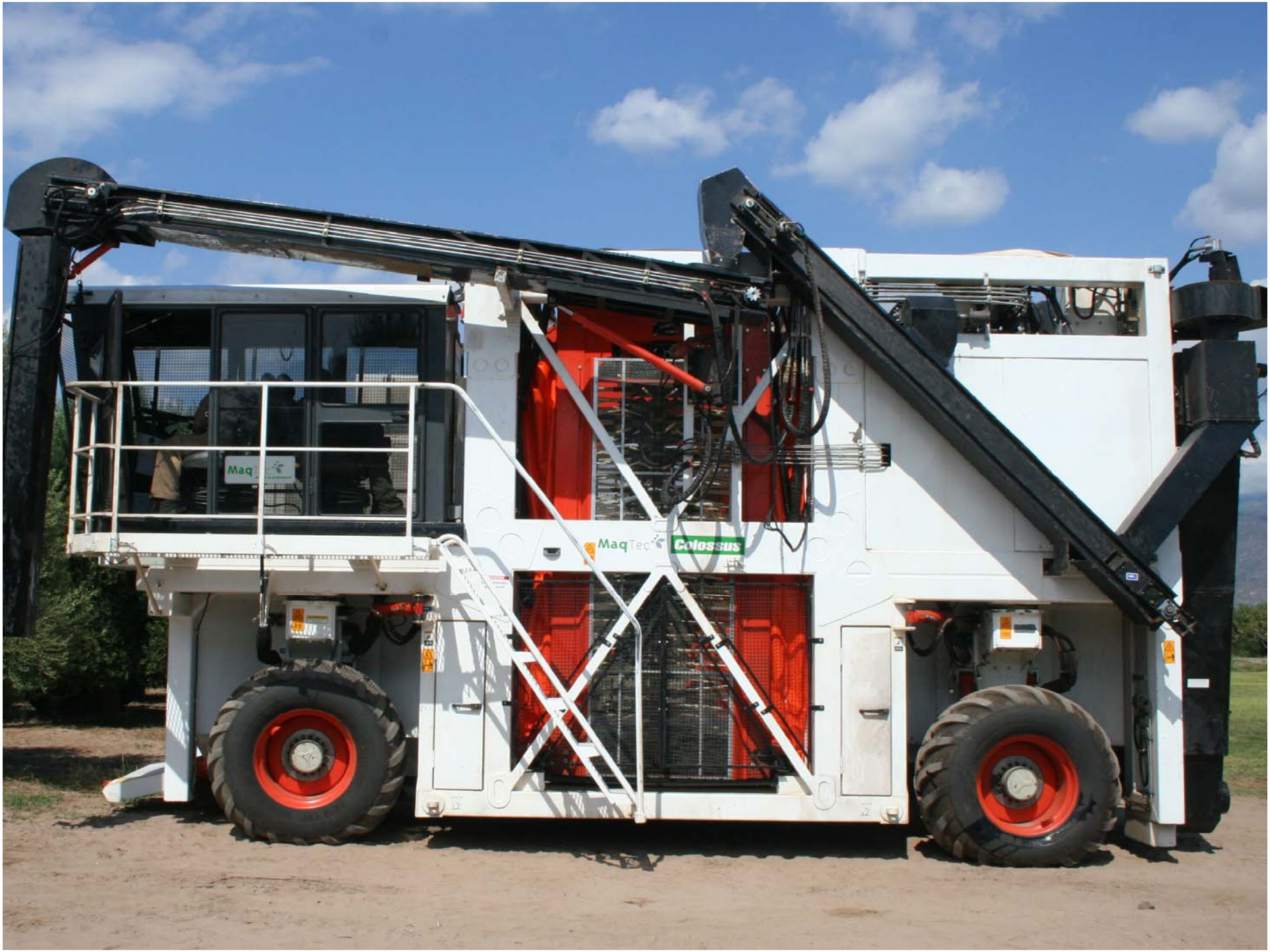
Applications Sept 28 & 29 - measurements October 9 & 10, 2007

	FDF (g)	leaf loss	leaf burn	frt burn	frt shvl	% frt drop
control	402	0.0	0.0	0.0	0.3	4
1 ppm 901	125	1.5	0.0	0.3	0.3	6
2 ppm 901	165	2.3	0.0	0.3	0.5	2
200 ppm 589	362	0.0	0.0	0.3	0.3	0
1000 ppm 589	408	0.0	0.0	0.5	0.0	7
2000 ppm 589	353	0.5	0.0	0.3	0.0	0
200 ppm 111	349	0.5	0.0	0.8	0.5	0
1000 ppm 111	405	0.0	0.3	0.5	0.5	0
2000 ppm 111	289	1.3	1.0	2.0	0.0	0
5 mM TIBA + 5000 ppm ethephon	182	2.0	0.0	0.5	0.0	28
5 mM TIBA + 7500 ppm ethephon	138	2.0	0.0	0.5	0.0	23
5 mM TIBA	387	0.0	0.0	0.5	0.0	0
5000 ppm ethephon	225	2.0	0.0	1.0	0.0	45
7500 ppm ethephon	49	2.5	0.0	0.8	0.0	47
5 mM 2-NAA	394	0.0	0.0	0.3	0.3	0
5 mM 2-NAA + 5000 ppm ethephon	215	3.0	0.0	1.0	0.3	23
5 mM 2-NAA + 7500 ppm ethephon	132	3.0	0.0	1.0	0.5	48
5 mM CPMPA	372	0.3	0.0	0.8	0.3	0
5 mM CPMPA + 5000 ppm ethephon	177	2.5	0.0	0.8	0.0	40
5 mM CPMPA + 7500 ppm ethephon	68	2.8	0.0	0.8	0.3	66
control	383	0.0	0.0	0.0	0.3	0

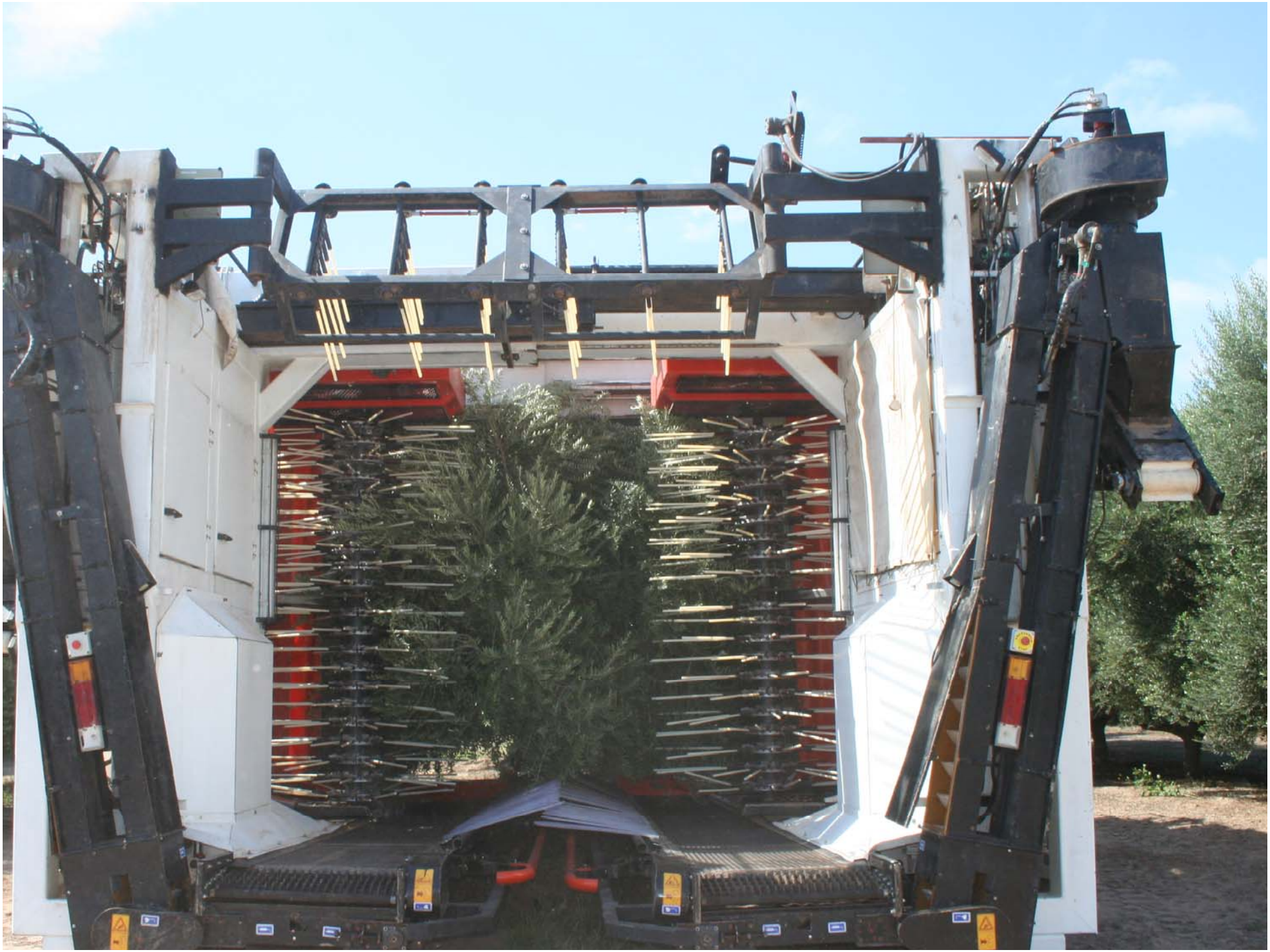
Poman, Catamarca, Argentina

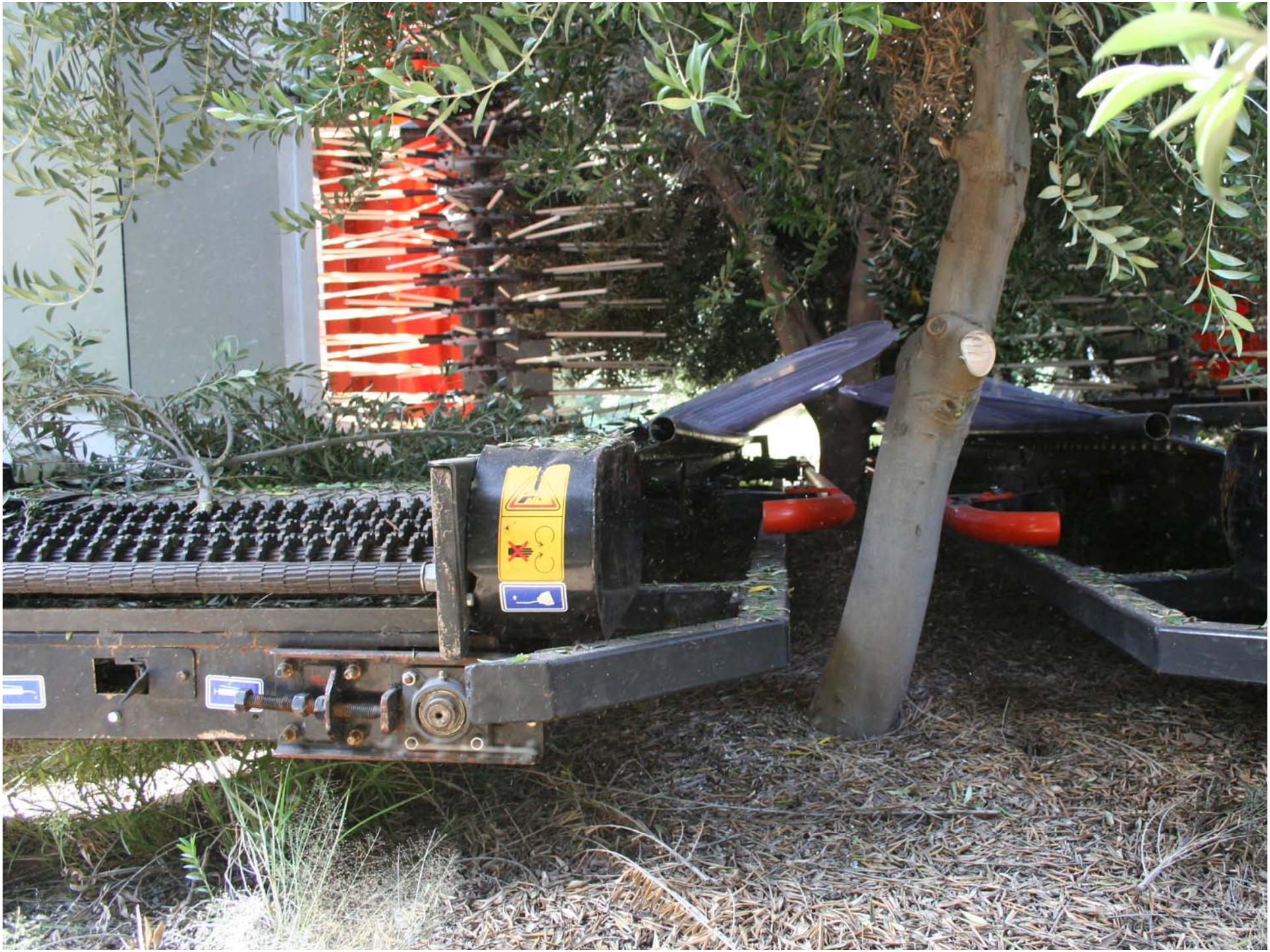
February 11th – 28th, 2008

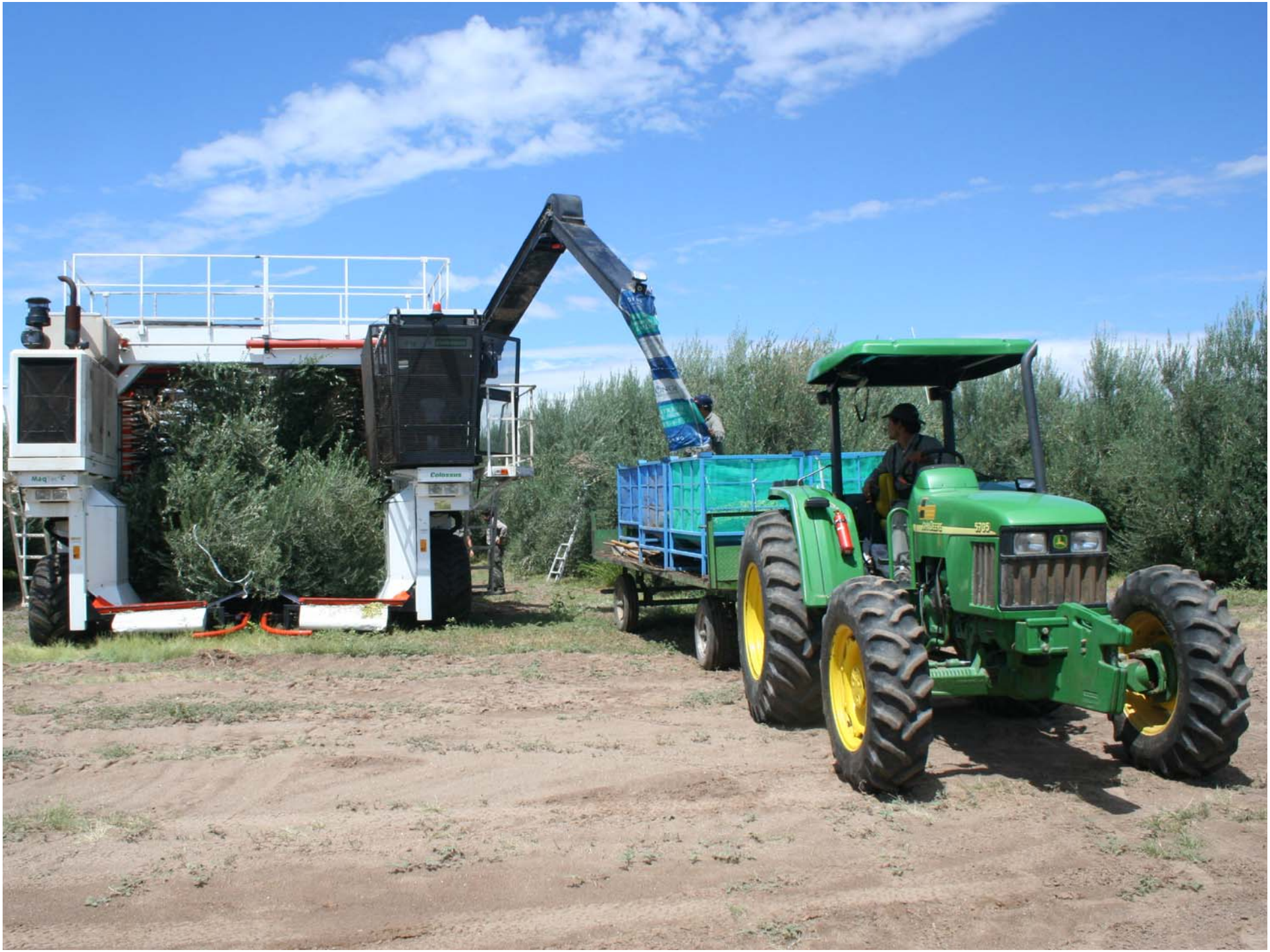


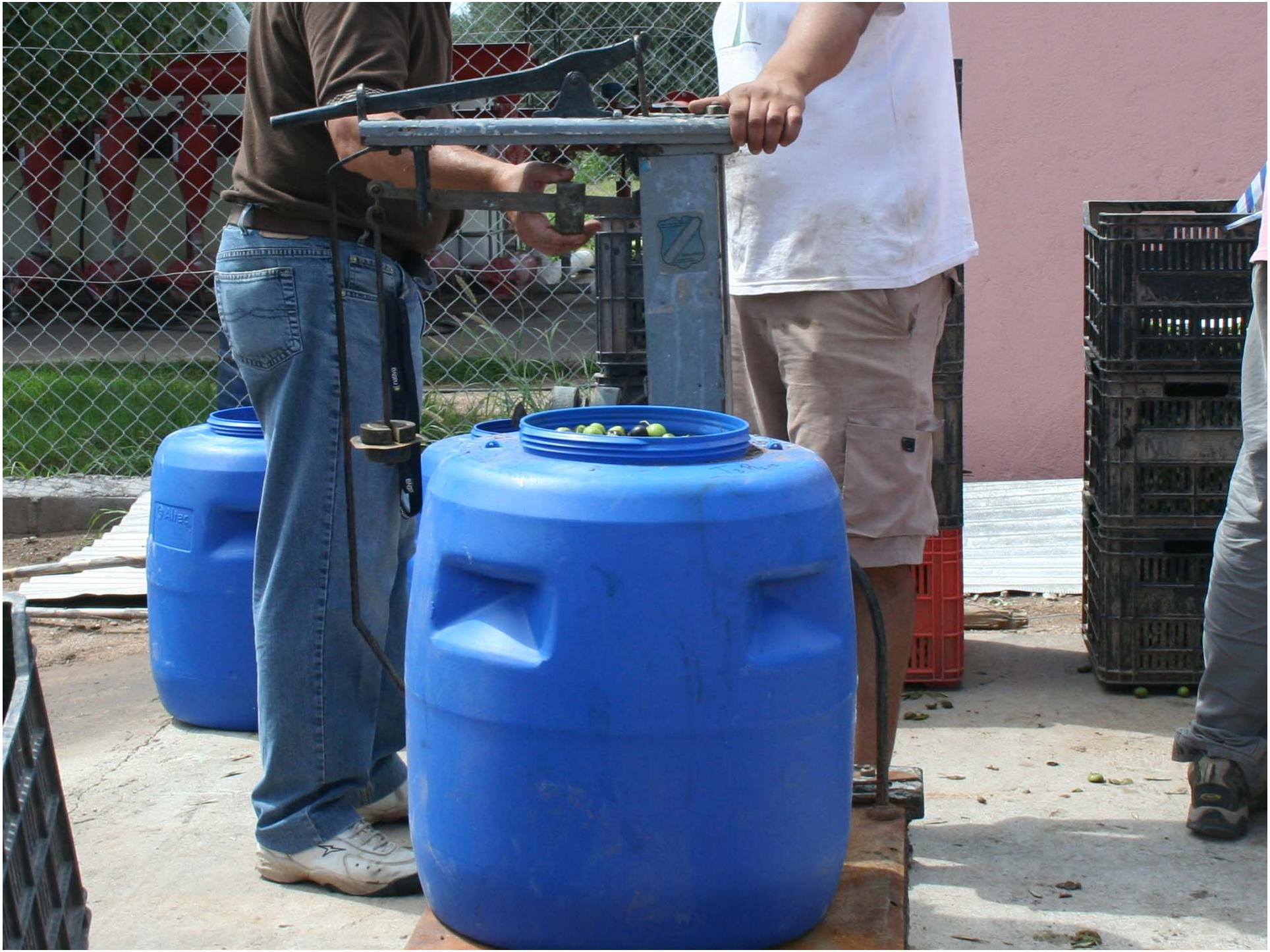

MaqTec
Colossus


MaqTec






Colossus
5715




Hand Harvest
24 hours
Machine Har

2008 Finca La Bella Harvest

- 750 PPM Ethephon 4% MPK+ 25% Adj.
- FDF @ 10 days
  - .400 kg vs .500 kg
- Leaf loss: 1.78 on 3 scale
- No effect on harvest efficiency
  - Equal fruit removal %

- MaqTec Efficiency*
- 99% removal
- 90% efficiency
  - 10% ground
- 24-30 seconds/tree
- Mild limb damage
- 100% fruit damage
  - severe

- * 3.5 tons/a

Conclusions: Objective I

- Evaluate all existing harvesters
  - Colossus
  - OMC
  - Coe Double Sided Shaker
  - ENE Double Sided
  - Wraparound Shaker
- Evaluate Efficiency:
  - % Removal
  - % Final
  - Seconds per tree, minutes per ton
- Commercially Acceptable Fruit Quality

Conclusions: Objective II

- Develop Tree Pruning for Mechanical Harvesting (current orchards)
  - Skirting
  - Topping
  - Hedging
- Develop New Orchards
  - Hedgerow
  - Trellised

Conclusions: Objective III

- Screen and Test Antioxidant Treatments
  - preharvest
  - postharvest
- Investigate Fruit Handling
  - Field brine(?)

Conclusions: Objective IV

- Evaluate Abscission Agents
  - ERCs + / - MPK and MP
  - Other promising compounds
    - Branch tests
    - Whole Tree Trials
      - Colossus

Final Objective:

- **Economic Net Return**
  - Harvesting Cost
    - Machine harvesting cheaper
  - Yield
    - Pruning may reduce
  - Harvester Efficiency
    - Won't remove all olives
  - Fruit Quality
    - May need to adjust receiving station grading

Questions?

Groups.ucanr.edu/olive_harvest

Mechanical Harvesting of Table Olives

University of California Cooperative Extension

- Main Menu
- The Project
  - Overview
  - Project Objectives
  - Our Team
  - Proposals & Reports
  - Our Cooperators
  - Photo Gallery
  - Statewide Olive Days
  - Resources
- Calendar

Mission

To develop mechanical harvesting for the California table olive industry.

This site presents the following: current research; project proposals and reports; project investigators; industry cooperators, and field days and meetings.

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Site was last updated on 12/3/07 at 04:41 PM

What's New 2007

Wednesday, Dec. 5, 2007
Louise Ferguson will speak on "Developing Mechanical Harvesting for California Table Olives."
Plant Sciences Department Seminar
PES 3001 at noon
UC Davis

Nov 8: 2007 Photo Gallery posted