

Mechanical Shoot & Leaf Removal Practices

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Introduction

- Why look for mechanical solutions?
- Mechanical shoot thinning – Murray Valley
- Mechanical Leaf removal – King Valley
- Limitations



Why mechanisation?

- 4 key reasons BB started looking at mechanical solutions:
 1. Reduce Vineyard Labour Cost
 - Labour is between 42% to 65% of our operating budgets
 - Finding ways to reduce this cost without impacting quality
 2. Enable labour intensive practises on commercial grade fruit
 - Shoot thinning & Leaf Plucking \$500-\$700/Ha
 - Limit there use to high value fruit
 3. Improve the speed & consistency of traditionally time consuming tasks
 - Mechanical methods are FAST and give a consistent level of quality
 4. OH & S benefits
 - Vineyards are hostile places and reducing the company's exposure to this risk is a significant reason to move towards mechanisation

Mechanical Shoot Thinning Murray Valley Style!!

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VS



Mechanical Shoot Thinning

- Shoot thin at Mystic Park??
 - Large Murray Valley vineyard
 - Gordo, Crouchen & Cienna
 - Fruit destined for commercial grade fruity wines
 - Predominately machine pruned
 - High cropping 18 – 40t/Ha
 - WHY??



Mechanical Shoot Thinning

- Crop reduction in Cienna

- 81Ha at Mystic Park
- CSIRO Variety
- Target Baume 14+
- High colour fruity red
- Tends to over crop
 - Methoxypyrazine compounds
 - Very Late Ripening
 - High risk of disease

AVERAGE YIELD ~27t/Ha

TARGET YIELD 20T/HA



Mechanical Shoot Thinning

- Past we have Mechanical bunch thinned

- Harvester used at EL31
- Aim to knock 25% of fruit off
- **HARD TO ACCURATELY DETERMINE THINNING RATE**
- **VINE & FRUIT DAMAGE**



Mechanical Shoot Thinning

- Started looking at Mechanical Shoot thinning
- Mechanical shoot thinning trial to answer:
 - Easier to estimate crop reduction?
 - Just as effective as mechanical bunch thinning?
 - Able to conduct early in the season?
 - Less impact on both vine and fruit?
 - Quicker process?



Shoot Thinning 2015

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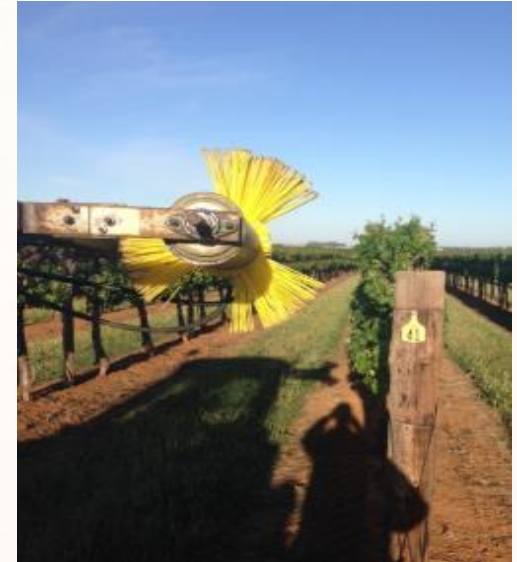
Shoot Thinning 2015



Treatment 1



Treatment 2



Treatment 3



Treatment 4



Shoot Thinning 2015

- Things we learnt from 2015
 - Treatment 4 was the best
 - Reduced yield by 12%
 - Didn't completely strip the vine
 - Removed whole shoots
 - Taped fingers were too rigid & caused damage



Shoot Thinning 2016

- 2015 led to the following thinner setup in 2016:
 - Simple frame supporting two hydraulic motors
 - Insertion rubber fingers
 - Spinning on the horizontal axis in a downward direction
 - Thinning rate greater on the top cordon



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Shoot Thinning 2016

Actual Yield at Harvest					
Treatment	Crush Date	Area (Ha)	Yield (T)	T/Ha	Harvest Maturity (Be)
Control	14th MAR	1.39	34.35	24.79	14.0
Thinned	10th & 15th MAR	5.02	97.56	19.43	14.3

- Great result!!
- Yield reduced by 22%
- No change in Harvest date but thinned section slightly higher Baume



Shoot Thinning 2016

- Fruit & Vine Damage at Harvest – **Shoot Vs Bunch Thin**



Mechanical **Shoot** Thinning



Mechanical **Bunch** Thinning

Questions Answered

- Easier to estimate crop reduction? **YES**
- Just as effective as mechanical bunch thinning? **YES**
- Able to conduct early in the season? **YES**
- Less impact on both vine and fruit? **YES**
- Quicker process? **Slower 1Hr/Ha Vs 0.7Hrs/Ha**



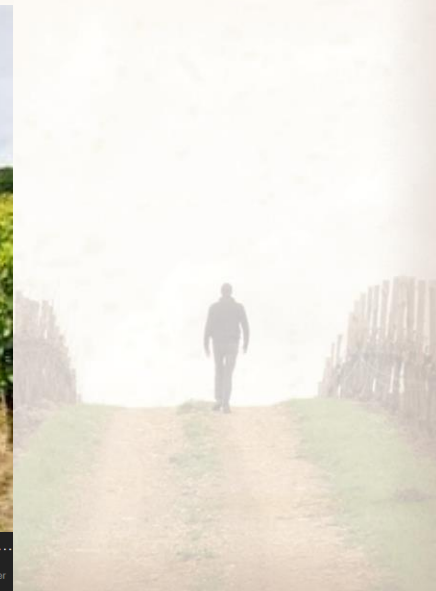
Financials

- Labour Saving
 - Hand Shoot thinning labour ~\$650/Ha
 - Machine Shoot thinning labour ~\$25/Ha
- Productivity Gain
 - 1hrs/ha Vs 25hrs/ha



Mechanical Leaf removal

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Mechanical Leaf Removal

- 3 Key reasons we mechanically leaf pluck:
 - Reduce Botrytis pressure in Dolcetto & Riesling at Milawa
 - Aid in fungicide penetration at Banksdale
 - Achieve a 15 to 20% productivity gain when handpicking at Whitlands



Mechanical Leaf Removal

- The unit we use is an ERO Single side roller Defoliator.
- The two vertical rotating rollers pluck the leaves
- Fan at the back extracts leaves away from the fruit zone
- Has hydraulic width & mast adjust



Mechanical Leaf Removal

- When to leaf pluck?
 - Disease & Spray penetration control - EL 26 onwards



Mechanical Leaf Removal

- When to leaf pluck?
 - Hand picking productivity – 1 day before harvest



Financials

- Cost of Unit
 - ~\$24,000
- Labour Saving
 - Hand leaf plucking labour - ~\$500/Ha
 - Machine leaf plucking labour - ~38/Ha
 - Hand Harvesting - ~20% productivity gain



Limitations

- If you need a 100% perfect job then do it by hand!!
- Shoot Thinner Limitations
 - Will still shred some shoots
 - May still ½ break some shoots
 - Harder to estimate reduction in crop compared to hand pass
 - Not selective
 - Best suited to large canopies with high shoot number
- Leaf Defoliator
 - Needs to be a VSP canopy to work well
 - Small level of damage to post veraison fruit

THANK YOU



Questions?

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