Developing a capacity to weigh and process almonds at harvest to enhance the efficiency of trials

Ben Brown
Almond Board of Australia (ABA)

Project Number: AL10011

AL10011

This report is published by Horticulture Australia Ltd to pass on information concerning horticultural research and development undertaken for the almond industry.

The research contained in this report was funded by Horticulture Australia Ltd with the financial support of the almond industry.

ISBN 0 7341 2375 2

Published and distributed by:
Horticulture Australia Ltd
Level 7
179 Elizabeth Street
Sydney NSW 2000
Telephone: (02) 8295 2300
Fax: (02) 8295 2399

Horticulture Australia

Developing a capacity to weigh and process almonds at harvest to enhance the efficiency of trials

Ben Brown

Almond Board of Australia Inc

Project Number: AL10011

AL10011
Developing a capacity to weigh and process almonds at harvest to enhance the efficiency of trials

Ben Brown
Industry Development Manager

Almond Board of Australia
PO Box 2246
9 William Street
Berri SA 5343
T: 08 8582 2055
F: 08 8582 3503
E: bbrown@australianalmonds.com.au
W: www.australianalmonds.com.au

Key Personnel

Brett Rosenzweig
Almond Industry Advisory Committee
Almond Industry Production Committee

Purpose of Report
This Final Report has been prepared following the conclusion of the final year of the project; *Developing a capacity to weigh and process almonds at harvest to enhance the efficiency of trials* (i.e. AL10011). The project summarises the methodology and results of the equipment, and its implications for the management of almond R&D trials.

Acknowledgements
This project has been funded by HAL using the Australian almond industry levy and matched funds from the Federal Government.

October 2011

Table of Contents

1 Media Summary

Global almond consumption has more than doubled over the past decade from nearly 291,000 tonnes in 1998 to 583,000 tonnes in 2008 (ABA, 2010).

With the aim of taking advantage of increased global consumption and the fact domestic consumption of almonds in Australia was lower than domestic production at the change of the century, the Australian almond industry increased its plantings more than six-fold from 2000. Currently, one quarter of the plantings are yet to reach full maturity and future production will continue to rise until 2017 when it is estimated to achieve 86,500 tonnes (ABA, 2010).

Almonds have always been an attractive crop for investment because the industry had always been profitable, stable and internationally competitive. To maintain the industry competitiveness and to ensure its continued and sustainable expansion it has expanded its research program. Over the next 5 years, the Almond Industry, the Commonwealth government and other funding partners are likely to invest $10 - 15million in R&D for the industry.

With such a large requirement for the infield weighing and processing of statistical sub-samples, a new method and purchase of appropriate equipment was required. The equipment has resulted in a time and therefore financial saving of greater than 50% in comparison to the previous method of collecting and processing the statistical sub-samples.

2 Technical Summary

Over the next 5 years, the Almond Industry, the Commonwealth government and other funding partners are likely to invest $10 - 15million in R&D for the industry.

With such a large requirement for the infield weighing and processing of statistical sub-samples, a new method and purchase of appropriate equipment was required.

To achieve the objective of increased efficiency in fruit analysis and reduce the need for manual labour in manual hulling and shelling, this project purchased two pallet scales, and one mini almond huller and sheller. The equipment is housed at a central position within the almond industry and is also suitable for transportation to other areas if required.

The equipment has resulted in a time and therefore financial saving of greater than 50% in comparison to the previous method of collecting and processing the statistical sub-samples.

3 Introduction

Global almond consumption has more than doubled over the past decade from nearly 291,000 tonnes in 1998 to 583,000 tonnes in 2008 (ABA, 2010).

With the aim of taking advantage of increased global consumption and the fact domestic consumption of almonds in Australia was lower than domestic production at the change of the century, the Australian almond industry increased its plantings more than six-fold from 2000. Currently, one quarter of the plantings are yet to reach full maturity and future production will continue to rise until 2017 when it is estimated to achieve 86,500 tonnes (ABA, 2010).

Almonds have always been an attractive crop for investment because the industry had always been profitable, stable and internationally competitive. To maintain the industry competitiveness and to

ensure its continued and sustainable expansion it has expanded its research program. Over the next 5 years, the Almond Industry, the Commonwealth government and other funding partners are likely to invest $10 - 15million in R&D for the industry.

Many of the current and future R&D projects will have a yield assessment which will require infield weight measurements and the hulling, shelling and kernel separation of numerous, statistical sub-samples. Examples of current R&D projects which will require the use of this mini huller and sheller are: AL08000, AL08003, AL08009, AL09027, AL09021 and AL09022.

With such a large requirement for the infield weighing and processing of statistical sub-samples, a new method and purchase of appropriate equipment was required.

4 Materials and Methods

To achieve the objective of increased efficiency in fruit analysis and reduce the need for manual labour in manual hulling and shelling, this project purchased the following equipment:

- Two pallet scales - A weighing system for each of the four almond growing regions (i.e. Adelaide, Riverland, Sunraysia and Riverina). These scales would reside in each region and then be transported and used between the local trials to conduct the infield measurement of tree yield weights. Once weighed, a subsample would be taken and transported to a central position (e.g. ABA's shed at the Budwood Repository in Monash, South Australia) where they would be processed using the equipment below.
- One mini almond huller and sheller (http://www.jesseemfg.com/videos.php) – One, new almond huller, sheller and separator manufactured by Jesse Manufacturing, California (Figure 1). The equipment is housed at a central position within the almond industry and is also suitable for transportation to other areas if required.

Figure 1: Almond Mini Huller and Sheller

5 Results

AL08000, AL08003, AL08009, AL09021 and AL09022 have all used the pallet scales and mini huller and sheller.

The huller and sheller has been successful, despite an incomplete separation. Initially, 82% of the kernel was being separated from the hull and shell. A higher result was more favoured, and thus some engineering adjustments (i.e. narrower tolerance between the rotor and liner) were made to the equipment to allow for a further improvement. This equated to a separation of approximately 87%. In discussions with the manufacturer, additional rotors and liners have also been ordered to gain additional improvements. These additional parts will arrive in January 2012 on a shared shipping container carrying almond harvest equipment.

Despite the incomplete separation of product using the current setup and parts, the purchase of the mini huller and sheller has equated to a considerable labour and time saving with the following results achieved:

	Pre Mini Huller & Sheller*	**With Mini Huller & Sheller^**
Staff #	4	3
Total hrs worked (inc travel, setup, etc)	96 hours	66 hours
Labour Cost	$2,400	$1,650
Total Kernel Weight	270 kg	445 kg
Output	**$8.90/kg**	**$3.71/kg**
	2.81 kg/hr	**6.74 kg/hr**

*Data from AL07005, ^Data from AL09022

6 Discussion

The purchase of the new equipment has resulted in considerable labour and time savings, and significantly improved processing outputs. Consequently, there has been less hand cracking and sorting of almonds and more resources available for the core requirements of R&D projects.

7 Technology Transfer

The equipment has been promoted and made available to the almond industry and its research partners via committee meetings and newsletters.

8 Recommendations

It is recommended the equipment purchased in this project be used as the standard approach to collecting, measuring and processing the statistical sub-samples of the almond industry's R&D program.

9 Acknowledgements

We acknowledge the role and financial assistance of the Australian Federal Government facilitated through Horticulture Australia Limited (HAL), the Australian almond industry, Almond Industry Advisory Committee and Production Committee.

10 References

http://www.jesseemfg.com/videos.php