

Improving the Accuracy of the Riverina Citrus Crop Forecast

Dominic Testoni
Riverina Citrus

Project Number: CT10028

CT10028

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

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

All expressions of opinion are not to be regarded as expressing the opinion of Horticulture Australia Ltd or any authority of the Australian Government.

The Company and the Australian Government accept no responsibility for any of the opinions or the accuracy of the information contained in this report and readers should rely upon their own enquiries in making decisions concerning their own interests.

ISBN 0 7341 2823 1

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

© Copyright 2012



Horticulture Australia

CT10028 – December 2011

Improving the Accuracy of the Riverina Citrus Crop Forecast

Melanie Garbett et al
Riverina Citrus

CT10028 – Improving the Accuracy of the Riverina Citrus Crop Forecast

Melanie Garbett
Acting Executive Officer
Riverina Citrus
PO Box 1432, Griffith NSW 2680

Purpose of the project

To update plantings statistics for Riverina orchards through the use of satellite photography and information held in the Arcview 'Geographical Information System' (GIS) developed in 2003 through the National Plantings Database project.

Funding

This project has been funded by HAL using a voluntary contribution from Riverina Citrus and matched funds from the Australian Government

Collaborating Institutions

I & I New South Wales
Terrabyte Services

15 December 2011

Disclaimer

"Any recommendations contained in this publication do not necessarily represent current HAL Limited policy. No person should act on the basis of this publication, whether as to matters of fact or opinion or other content, without first obtaining specific, independent professional advice in respect of the matters set out in this publication."

Table of Contents

Media Summary	2
Introduction	3
Technical Transfer Strategy & Methodology	4
Evaluation & Measurement of Outcomes	
Varieties	7
Bearing & Non-Bearing Hectares by Variety	8
Irrigation	10
Discussion	11
Recommendations	11
Acknowledgments	11
Appendix 1 – Grower Survey	12

Media Summary

Riverina Citrus uses a scientific formula to calculate the yearly crop forecast. Over the years, this formula has been proven to be mostly accurate in predicting the proposed yield for any given year. The committee would, however, like to increase this accuracy to within 5%.

The major factor in the calculation of the Riverina Citrus crop forecast is the number of trees, or hectares, of each variety within the growing area. To calculate this number Riverina Citrus was using statistics held in our Arcview GIS system, developed in 2003, through the National Plantings Statistics database project.

Under the project, Riverina Citrus adopted Geographical Information System (GIS) technology, incorporating digital imagery derived from satellite photography, for mapping and the management of detailed citrus planting information. The system was in line with that used in the Murray Valley, and by what was to be adopted nationally through the then Australian Citrus Growers. Riverina Citrus also had an additional partner in the development stages in the Riverina Wine Grapes Marketing Board.

The Riverina Citrus Plantings Database is now held in high esteem across all facets of the citrus industry in the Riverina. Not only is the information provided through the database essential in the formulation of the Riverina Citrus crop forecast, but it is used as an important marketing tool across the industry.

Riverina citrus growers find the generation of whole farm plans a valuable service provided by the committee, and are keen to use this service at every possible opportunity, and find it a useful planning tool. The Committee also hoped to offer this tool to the other citrus production areas within NSW.

In 2010, after numerous reported changes in plantings, Riverina Citrus approached Horticulture Australia Limited to financially assist in the undertaking of an update in the satellite imagery, and ground surveying, to assist in reaching the organisations goal of yield prediction accuracy within 5% of the crop forecast.

Although 35% of surveys are yet to be finalised, we are able to deduct strong indications as to the trends of the plantings on Riverina citrus properties, and this information will continue to be collected into 2012.

Introduction

The Riverina Citrus Committee uses a scientific formula to calculate the yearly crop forecast. Over the years, this formula has been proven to be mostly accurate in predicting the proposed yield for any given year. The committee would, however, like to increase this accuracy to within 5%.

The major factor in the calculation of the Riverina Citrus crop forecast is the number of trees, or hectares, of each variety within the growing area. To calculate this number Riverina Citrus was using statistics held in our Arcview GIS system, developed in 2003, through the National Plantings Statistics database project.

Under the project, Riverina Citrus adopted Geographical Information System (GIS) technology, incorporating digital imagery derived from aerial photography, for mapping and the management of detailed citrus planting information. The system was in line with that used in the Murray Valley, and by what was to be adopted nationally through the then Australian Citrus Growers. Riverina Citrus also had an additional partner in the development stages in the Riverina Wine Grapes Marketing Board.

In 2008, after 5 years without an update of the photography, Riverina Citrus and the Riverina Wine Grapes Marketing Board together organised a renewal of photographic images through a local company involved in satellite imagery. This consequently led to a ground survey being conducted and in turn an update in the accuracy of planting statistics, and crop forecast information.

The Riverina Citrus Plantings Database is now held in high esteem across all facets of the citrus industry in the Riverina. Not only is the information provided through the database essential in the formulation of the Riverina Citrus crop forecast, but it is used as an important marketing tool across the industry.

Riverina citrus growers find the generation of whole farm plans a valuable service provided by the committee, and are keen to use this service at every possible opportunity, and find it a useful planning tool. The Committee also hoped to offer this tool to the other citrus production areas within NSW.

In 2010, after numerous reported changes in plantings, Riverina Citrus approached Horticulture Australia Limited to financially assist in the undertaking of an update in the satellite imagery, and ground surveying, to assist in reaching the organisations goal of yield prediction accuracy within 5% of the crop forecast.

Technical Transfer Strategy & Methodology

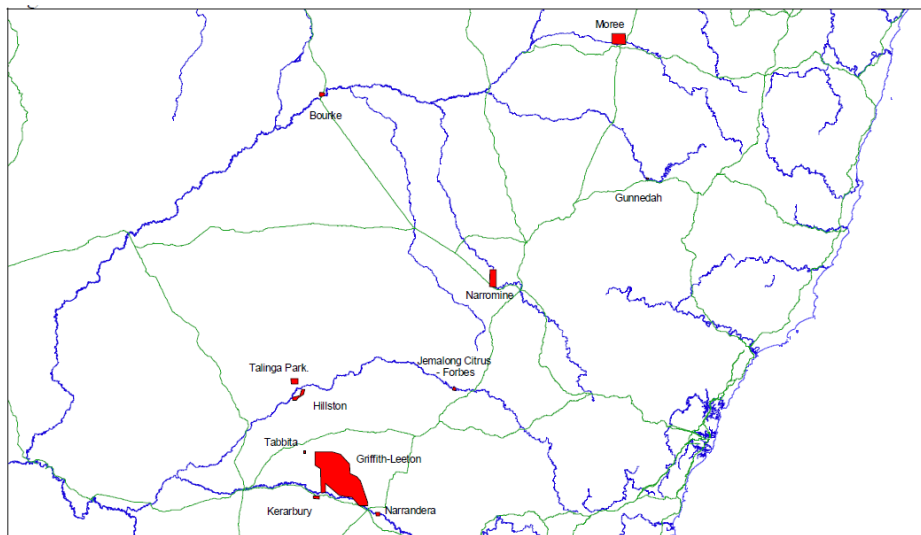
The satellite capture was undertaken in April 2011, after lengthy delays due to unseasonal cloud cover over New South Wales during the summer months.

The capture was co-ordinated through a Wagga Wagga based company, Terrabyte Services, and covered the citrus growing areas of the Riverina, Forbes, Moree, Narromine, Bourke and Gunnedah.

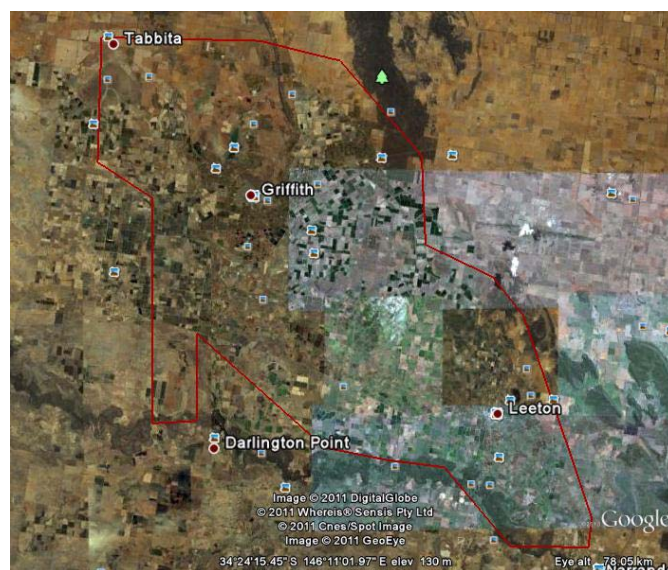
The high resolution natural colour imagery was taken through the use of Digital Globe's Quickbird satellite and supplied as 60cm resolution. The imagery was derived from the raw 60cm panchromatic and 2.5m multi-spectral imagery.

Typical individual images covered an area of up to 16km and were combined to produce a seamless mosaic of the area.

Below is a map of the areas that were captured through the project. The areas that were imaged included 12 separate areas totalling 3,069km².



In order to establish the capture areas, individual kml files were made using Google Earth and forwarded to Terrabyte Services. An example of the Griffith-Leeton file appears below:



In forming these graphics, the Industry & Promotions Manager was required to view Google Earth images and establish where citrus properties were located.

Once captured, Terrabyte Services converted the satellite photos into ECW format to ensure compatibility with the Arcview GIS System currently being used by Riverina Citrus.

Farm plans of each individual citrus property were completed and mailed to growers in the Riverina, along with a comprehensive farm survey to be completed and returned to the Riverina Citrus office (a copy of the farm Survey appears as Appendix 1). A total of 609 farm plans were drawn, an example of the format appears below:



Upon return of the grower surveys to the Riverina Citrus Office, amendments were made, if required. The grower was then issued with two colour farm plans for their farm records.

NORTHERN NEW SOUTH WALES

The initial identification of the Northern New South Wales properties was difficult, as no historical data, or coordinates for these properties was held by Riverina Citrus.

Once the identification occurred, growers in the Moree, Forbes, Bourke, Gunnedah and Narromine areas were contacted as offered an opportunity to become involved in the project.

To date, one property owner out of the eleven approached has shown interest in the project, resulting in the Riverina Citrus Industry Development Officer undertaking ground truthing on Jemalong Citrus in Forbes in late June 2011.

Evaluation & Measurement of Outcomes

At the time of compiling this report, 65% of growers' surveys had been returned and entered into the GIS system as 2011 statistics.

According to the 2011 statistics, the Riverina Citrus industry comprises of 3,476,129 citrus trees covering some 8,610 hectares. Citrus plantings have increased approximately 130 hectares since the last survey of growers undertaken in 2008.

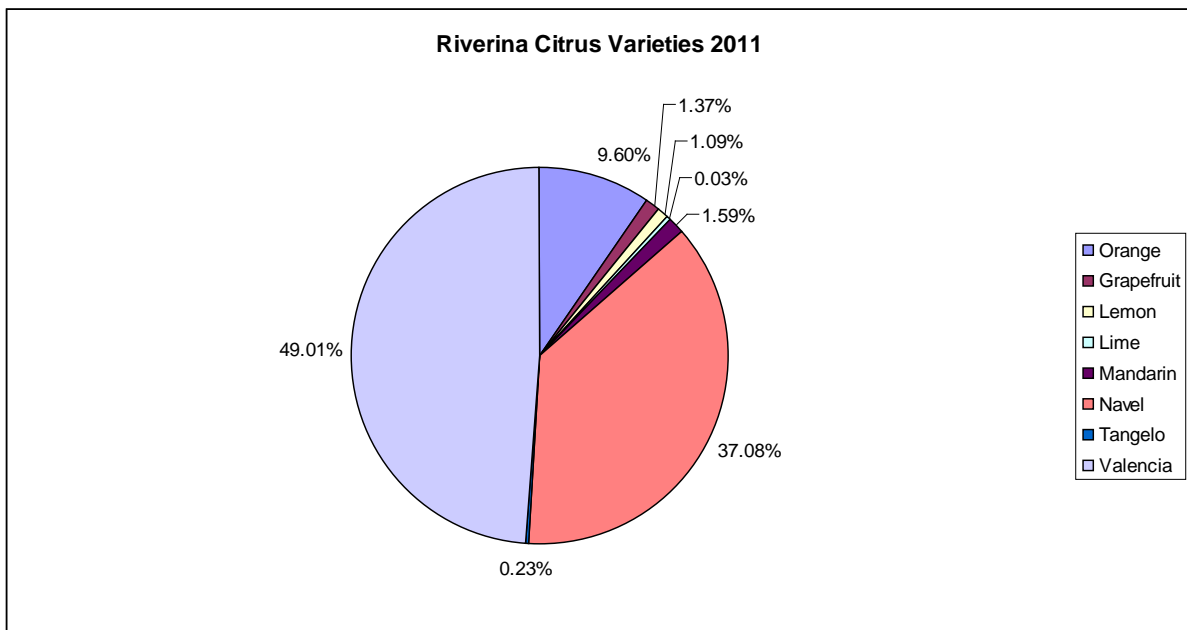
Varieties

The Valencia orange remains the strongest variety of citrus in the Riverina, equating to 4218.37 hectares or 49.01% of all plantings.

Increasing numbers of common orange varieties are emerging, with 460 hectares planted to new juicing varieties, such as Salustiana and Hamlin.

Minimal plantings of Lime, Lemon, Tangelo and Grapefruit varieties remain.

Navel plantings are also prominent and remain steady with 3,191 hectares of plantings.



The Northern citrus growing area of Forbes consists of 250 hectares of juicing oranges, planted originally for mechanical harvesting. Other Northern areas also consist of large plantings of the common varieties, to be used primarily for juicing.

Bearing and Non-Bearing Hectares by Variety

CATEGORY	VARIETY		2011 HECTARES		
			Bearing	Non-bearing	Total
Citrus	<i>not surveyed</i>		389	0	389
Grapefruit	Grapefruit	<i>unspecified grapefruit</i>	78	0	78
	white flesh	Marsh	14	1	15
	Grapefruit	Rio Red	1	0	1
	pink & red	Ruby (Red,Pink)	4	1	5
	flesh	Star Ruby	9	10	19
		Thompson	0	0	0
Lemon	<i>unspecified lemon</i>		54	2	56
		Eureka	14	22	36
		Lisbon	2	0	2
		Meyer	0	0	0
Lime	<i>unspecified lime</i>		1	0	1
		Tahitian	0	1	1
Mandarin	<i>unspecified mandarin</i>		42	0	42
	Mandarin	Dekopon	0	5	5
	early season	Tangerine	0	1	1
		Imperial	32	7	39
		Nules Clementine	4	0	4
		Satsuma	0	1	1
	Mandarin	Afourer	0	36	36
	mid season	Daisy	2	0	2
		Ellendale	5	0	5
	late season	Murcott	3	0	3
Navel	<i>unspecified navel</i>		188	0	188
	Navel	<i>unspecified early navel</i>	4	0	4
	early season	Atwood	19	10	29
		Fisher	5	0	5
		Fukumoto	4	5	9
		Leng	66	0	66
		M7 Navel	0	6	6
		Mercuri Navel	0	7	7
		Navelina	177	12	189
		Nucellar Leng	3	0	3
		Pasin	18	0	18
		Rosey Red	2	0	2
		Ryan	10	0	10
		Winter Navel	1	0	1
	Navel	Cara Cara (Red Navel)	48	39	87
	mid season	Palmer	3	0	3
	Washington	1193	8	1,201	

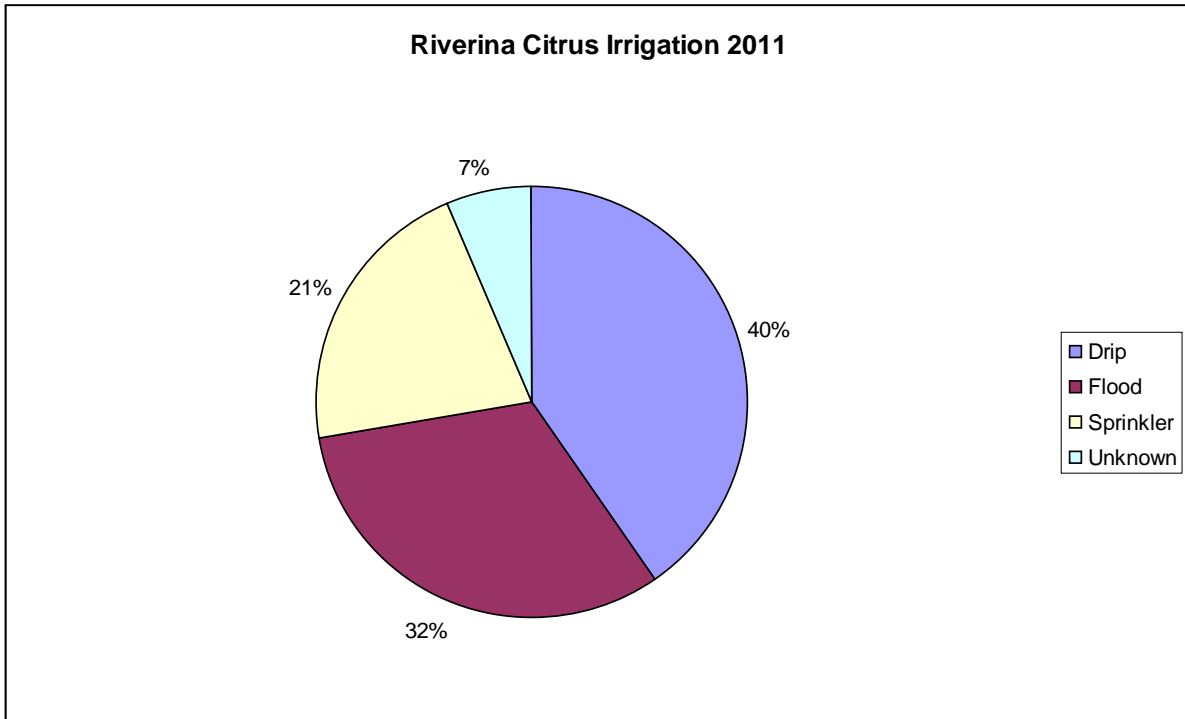
	Navel	<i>unspecified late navel</i>	200	12	212
	late season	Autumn Gold	3	0	3
		Barnfield	72	0	72
		Chislett	81	23	104
		Clark (Doug Clarke)	23	0	23
		Late Lane	831	26	857
		Powell	45	28	73
		Summer Gold (Marrows)	2	0	2
		Toc	12	0	12
		Wiffen	3	0	3
Orange	Blood	<i>unspecified</i>	6	0	6
misc.	Orange	Arnold (Moro)	0	29	29
		Maltese	0	0	0
		Ruby	1	0	1
		Tarocco	0	3	3
	Sweet	Acidless (Non Acid)	0	0	0
	Orange	Common Orange	1	0	1
		Hamlin	60	68	128
		Lima acidless	0	3	3
		Parson Brown	11	16	27
		Pera (Bianchi, Limeria)	19	0	19
		Pineapple	32	3	35
		Salustiana	60	120	180
		Seleta (Siletta)	2	0	2
	Sour	Seville	3	0	3
Tangelo	Tangelo	<i>unspecified Tangelo</i>	14	0	14
		Minneola	6	0	6
Valencia	Valencia	Dwarf	7	0	7
		Pecta	2	0	2
		Valencia	3987	100	4,087
	Seedless	Delta	3	26	29
	Valencia	McMahon	2	14	16
		Midknight	12	1	13
		Valencia Seedless	59	8	67
Total			7,954	654	8,608

Through these statistics it is apparent that the trend in the Riverina is to continue planting juicing varieties, such as Valencia and Common Oranges with 359 hectares to come into bearing in the near future.

Irrigation

Irrigation methods in the Riverina are constantly evolving, with 40% of our plantings now on drip irrigation, a small but marked increase on the statistics held in 2008.

Flood or Furrow irrigation remains at 32%, with farmers changing to drip over the past three years.



All plantings at Jemalong Citrus remain under drip.

Discussion

Riverina Citrus will continue to collect grower statistics, when they are made available, and will be constantly updating the organisations Arcview system and website with this information at www.riverinacitrus.com.au. Trends in crop variation will continue to be communicated to the local and national industry through the Riverina E-news, and other similar publications.

Relationships with the Northern citrus growing regions will be maintained, and the provision of services to these areas will continue to be investigated, pending the result of a poll of Riverina Citrus growers into the future of the Riverina Citrus industry.

As the updated figures were not available for use in the formulation of the 2011 Riverina Citrus Crop Forecast, the true gauge of this project will be established when the results of the 2012/2013 citrus crop are finalised in late 2013.

The evaluation of the information collected will appear in a forthcoming edition of the Riverina E-news, a fortnightly publication distributed to some 650 growers and industry personnel.

Recommendations

It is recommendation of the Riverina Citrus committee that the outstanding survey information continue to be collected in order to greater ascertain varietal trends and developments in the Riverina industry. This may be done in a number of ways, but will most likely be achieved by an external contracting agency, employed to visit each grower and update their planting details. It is expected that the funding for the collection of this information will be included in the Riverina Citrus Budget for 2012/2013.

With ever increasing plantings of Common Orange varieties, the collection of this information is critical in ensuring that the Riverina Citrus Annual Crop forecast is accurate within the 5% that is needed.

The Riverina Citrus Committee continues to believe that the collection of planting statistics is one of the essential functions of Riverina Citrus, and will continue to do so in the future.

Acknowledgements

Riverina Citrus Committee & Staff
Terrabyte Services
Riverina Citrus Industry Development Officer, Darren Gibbs
Sunrise 21

RIVERINA CITRUS PROPERTY SURVEY 2011



FARM ID:

Please make any changes where necessary

CURRENT DETAILS	NEW DETAILS
Name of Person/s, Company or Partnership	Name of Person/s, Company or Partnership
Trading Name:	Trading Name
Mailing Address:	Mailing Address:
Telephone:	Telephone:
Fax:	Fax:
Mobile:	Mobile:
Email :	Email :
Name and Address of one person to vote in the event of a poll	Name and Address of one person to vote in the event of a poll
Same as contact details <input type="checkbox"/>	Same as contact details <input type="checkbox"/>

TO BE COMPLETED IF YOU HAVE BOUGHT OR SOLD A FARM SINCE 2007

This information is collected under the authority of the Agricultural Industry Services Act 1998, which provides for the compulsory collection of information from persons growing citrus within the Riverina. Individual returns remain confidential to Riverina Citrus, and the statistics will only be released as aggregated data.

Vacated/Acquired (cross out one)	Date of Transaction:	If a lease - Duration (years):
To or from (Full Name):		
Of (Address):		Postcode:
Municipality of:		

ARE YOUR CITRUS PLANTINGS AS LISTED ON THE ATTACHED CROP PLAN TABLE?

PLEASE TICK

YES

NO

IF THE ANSWER IS NO, PLEASE RECORD ALTERATIONS ON THE TABLE BELOW.

ALTERATIONS TO CITRUS PLANTINGS BY TREE REMOVALS REPLANTING OR GRAFTING SINCE THE PREVIOUS SURVEY IN 2007.

Patch	Area Ha	Row Ft	Plant Ft	Trees	Variety	Rootstock	Year	Rework Year	Interplant Year	Interplant Variety	Interplant Rootstock	Irrigation	Yield (tonnes per Ha)
eg A	1.75	22	11	714	Valencia	Tri	1996	2007	2005	Washington	Tri	Drip	19

If insufficient space please turn page over and complete changes in table provided on the back of this form.

This form is to be signed and returned to Riverina Citrus by the person who should be contacted if any queries arise regarding this return:

Name:

Telephone:

Signature:

Facsimile:

