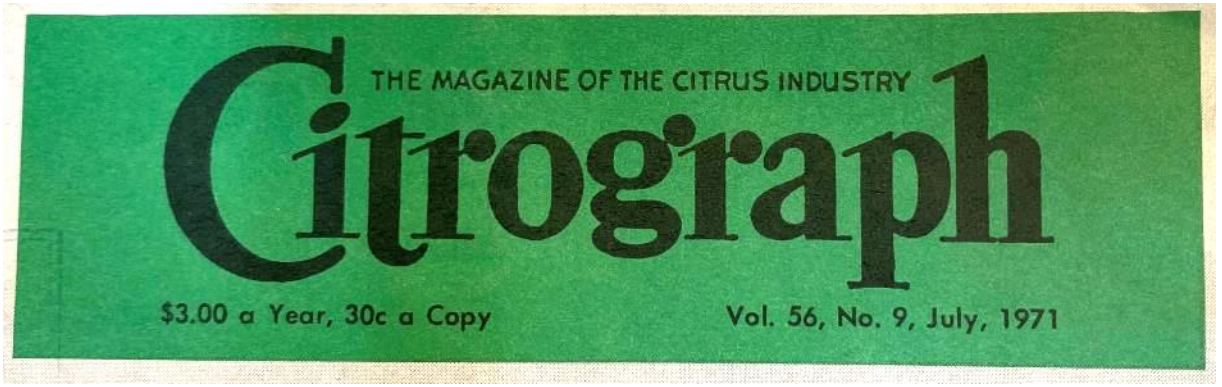
Citrus Congress 2024:
Tree intensification

Dave Monks

This is a project of the *National Tree Crop Intensification in Horticulture Program (AS18000)*, funded by the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from NSW Department of Primary Industries and contributions from the Australian Government.

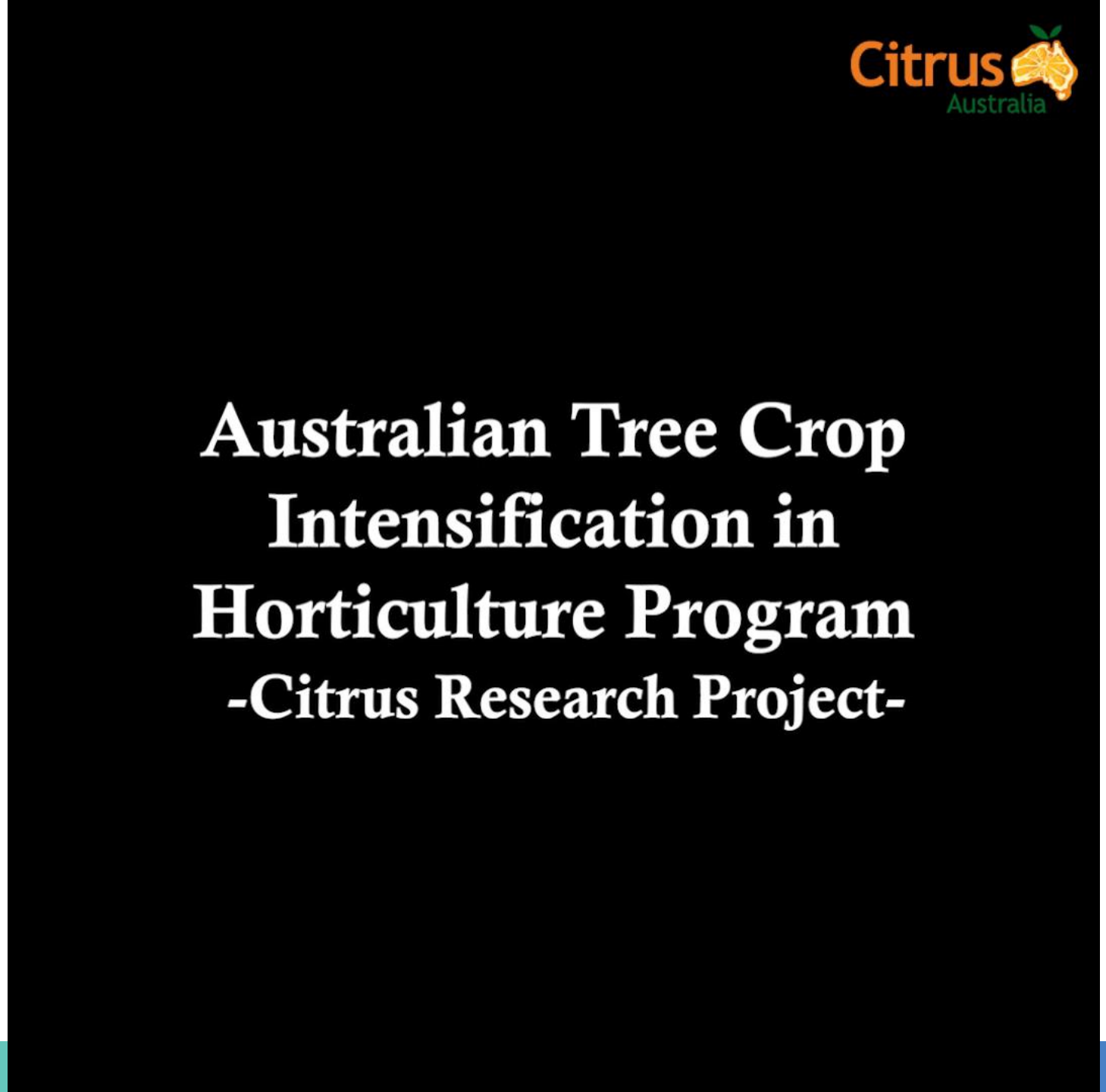


Effects of training, hedging on young Valencia (1971)

Introduction

The natural growth habit of an orange tree is upright and nearly spherical. When closely planted, crowding may cause them to become somewhat columnar (2). Citrus tree shape can be changed by training and pruning. Pruning stimulates new growth; the heavier the cutting the greater the stimulation, assuming the tree has no other problems. Shamel and Pomeroy (4) reported that pruning reduced yield in almost the same proportion as the amount of foliage removed.

Citrus Australia Output

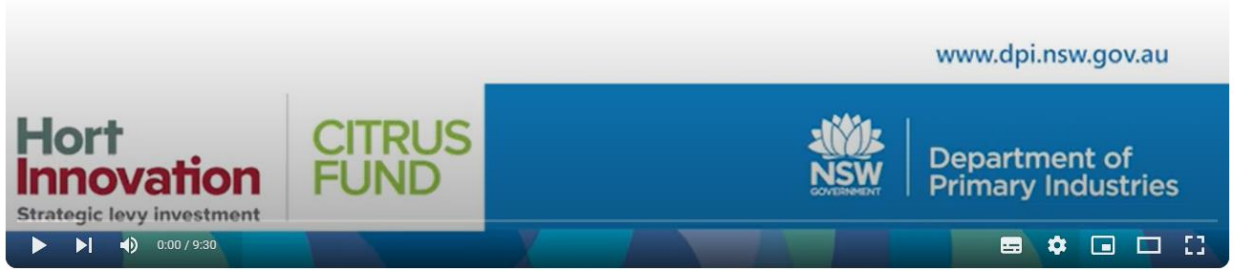


Pruning

Videos

Spain Morocco Afourer Study tour 2022

Afourer intensive pruning
Crescasa Farms, Seville, Spain



Field days, workshops

Pruning for $$

First grade navels get DOUBLE the price than second grade. Annual pruning is one of the best ways to improve packouts and its not as expensive as you think

"train you and your labourers on basics of pruning"

Hillston, Griffith and Leeton
30 min workshops
All invited

- Mon 26 Jul 2:30 pm: Super Seasons Talinga, Hillston
- Wed 26 Jul 1 pm: Mario's Packhouse, Research Stn Rd, Yoogali
- Thu 27 Jul 1 pm: Villa Rosa, Farm 1986, Davies Rd, Leeton

Limited to 5 participants per session

Register by SMS to Steven 0427 208 611 : your name and district
You will receive a reply to confirm
(if you do not get a reply please call)

This pruning demonstration is part of the 60+ Riverina project initiative (Riverina 60% 1st grade packout target) supported by Griffith and District Citrus Growers, Leeton Citrus Growers, Mario's Packhouse, Golden Grove Citrus, Joe's Citrus, Clear Lake Citrus, Lakes View Citrus and Pacific Fresh. This initiative is also a linked activity to the AS18000 Hort Innovation Tree Intensification project.

For more details contact Steven Falivene 0427 208 611 or Andrew Creek 0428 934 952

Golden Grove Citrus · Mario's Packhouse Quality Australian Citrus · Pacific Fresh · Clear Lake Citrus · Joe's Citrus · Leeton Citrus Growers Inc. · NSW Government Department of Primary Industries · Griffith & District Citrus Growers · Lakes View Citrus

Factsheets, financial tools are coming

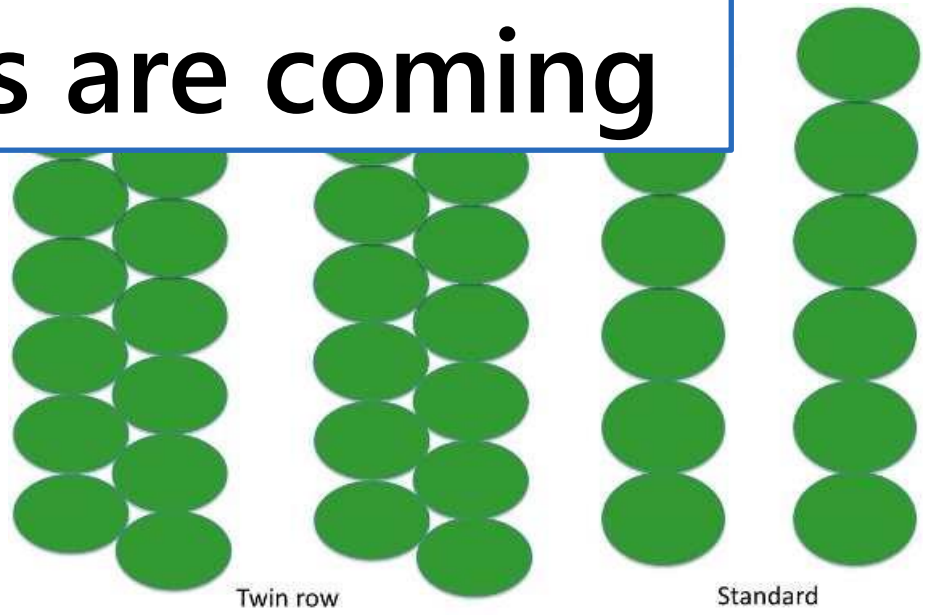
High-density planting and pruning case study:

Sunmar Orchards, Sunraysia

Key points

- High-density plantings boost returns
- Different layout, different management
- Cashflow break even reached sooner

High-density plantings are delivering very good long-term returns to Sunmar Orchards in the Sunraysia region, the results of which are backed up by an economic analysis by the NSW Department of Primary Industries (NSW DPI).



Viroids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Dwarfing citrus trees using viroids

Sandra Hardy

Industry Leader, Citrus
NSW DPI, Gosford Horticultural Institute

Graeme Sanderson

Research Horticulturist, NSW DPI, Dareton

Patricia Barkley

Former Citrus Pathologist, NSW DPI

Nerida Donovan

Plant Pathologist, NSW DPI
Elizabeth Macarthur Agricultural Institute, Menangle

Background

In the 1940s and 1950s the Australian citrus industry was decimated by phytophthora root rot which affected trees on sweet orange and rough lemon rootstocks. This prompted the citrus industry to focus on the use of *Poncirus trifoliata*, which was resistant to phytophthora root rot. However, *P. trifoliata* at that time was an unreliable stock producing some trees which were dwarfed and unthrifty, and sometimes showing symptoms of butt scaling.

These symptoms were attributed to a number of strains of citrus exocortis viroids (CEV). The various strains were classified as mild, moderate or severe, depending on the extent of tree stunting, decline

Case studies

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Citrus Australia
Hort Innovation CITRUS FUND

Pioneering citrus dwarfing viroid use in the Riverina

BY DR MAHMUD KARE AND STEVEN FALIVENE

Alan Harrison and Vince Iannelli have pioneered the use of graft transmissible dwarfing (GTD) viroids in the Riverina for over 30 years.

The pair's extensive experience with this technology provides valuable learnings for the entire industry. Here's a look at the difference dwarfing viroid use has made to the management and profitability of their orchards.

ALAN HARRISON'S EXPERIENCE

Alan Harrison grows moderate- to high-vigour common oranges for juice production in Stanbridge, New South Wales, which are ideal for dwarfing.

His dwarfed trees are 2.6 metres tall (Figure 1), half the height of his mature, conventionally grown trees.

Alan said dwarfed trees present a considerable advantage when it comes to maximising picking efficiency.

"The mature dwarfed trees enable a person to pick 13 bins from the ground daily compared to ten bins when using ladders," Alan explained. "Furthermore, the dwarfed Salustiana, Hamlin, and Parson Brown (Figure 2) common orange varieties on Tri22 rootstock consistently yield between 50-60 tonnes per hectare annually."

However, Alan cautioned that careful consideration is required when deciding to dwarf citrus trees.

"It's important to use good quality nursery trees and target maximum growth in the early years," he said.

"In the first four seasons, GTD-inoculated trees grow at the same rate as non-infected trees. In the fifth season, the size-controlling effect becomes quite obvious."

Researchers from the New South Wales Department of Primary Industries (NSW DPI) have been working on the use of viroids for several years. They are extending this research as part of the citrus project in the National Tree Crop Intensification in Horticulture Program (AS18000).

The researchers have found that promoting rapid canopy expansion in the establishing years is important, as the available space within the canopy can be filled in before the slow-down effect occurs.

To maximise the dwarfing effect, trees with moderate-to-high vigour can be inoculated 12 months after planting (Figure 3). In comparison, moderate-to-slow varieties can be inoculated 18 months after planting, reducing the intensity of the dwarfing effect.

In Alan's experience, he does not recommend using dwarfing viroids in replant situations or on heavy clay soils because they slow the initial growth rate and compound the dwarfing viroid effect.

VINCE IANNELLI'S EXPERIENCE

Leeton's Vince Iannelli agrees with Alan, based on his experience with filling a canopy with a slower-growing variety, on a slower-growing rootstock, in slower-growing soil.

Vince applied GTD to navel orange trees growing on Tri22 rootstock in clay loam – both known for their slow development. This resulted in a substantially reduced canopy growth rate. This was because GTD inoculation further reduced the growth rate of the slower-growing trees. Consequently, the tree canopies did not grow quickly enough to close over and fill the rows.

(Figure 1) The mature, dwarfed Salustiana trees attained a height of 2.6 metres, whereas a tree that missed inoculation is 5 metres tall.

(Figure 2) Alan Harrison checks the 2022 season crop on Parson Brown.

Videos

Dwarfing citrus trees using viroids

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Converting to trellis

Espalier

Palmate

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Videos

NSW DPI Citrus Trellising Trial

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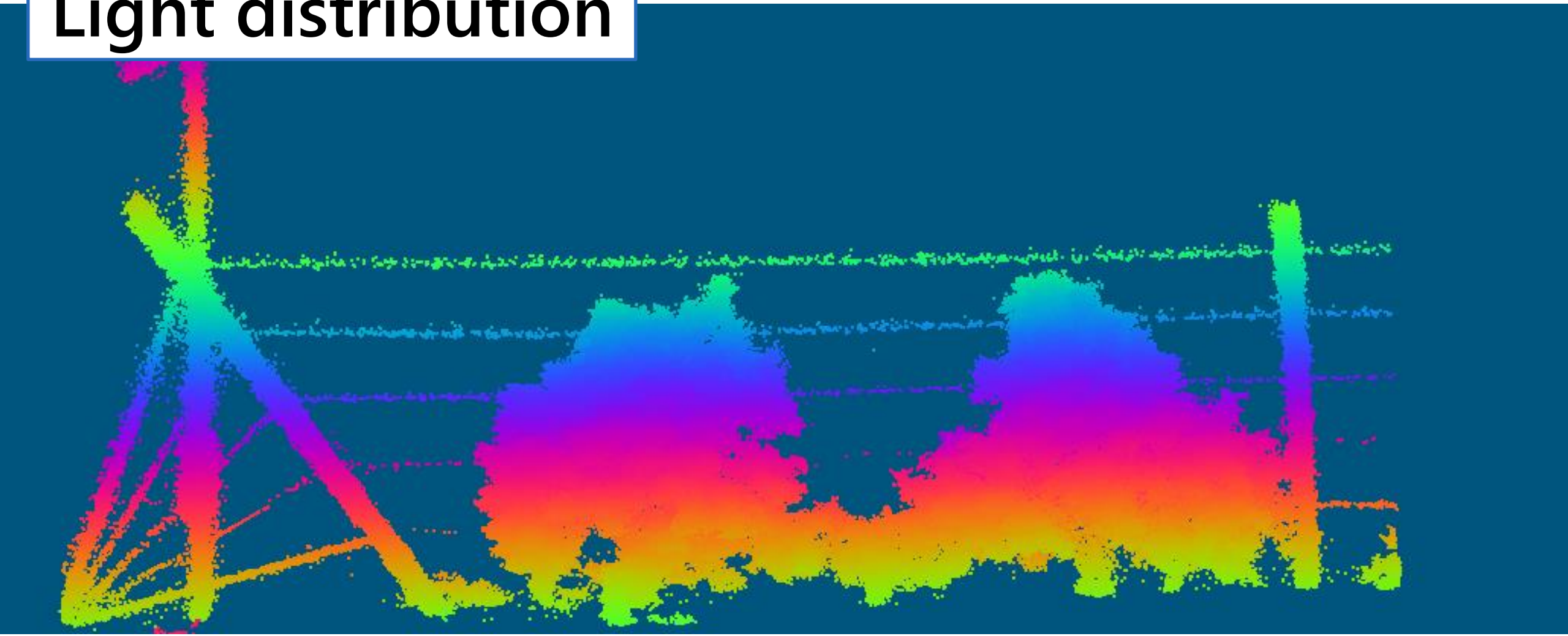
Light distribution



Articles

PAST ISSUE:

April/May 2022

Released May 2, 2022

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Growing high density citrus for profit

Dave Monks
New South Wales DPI

The citrus industry will benefit from new insights into what it takes to establish and manage more intensified orchard systems as a result of a five-year program of research underway by the New South Wales Department of Primary Industries (NSWDPI). The project is funded by the Hort Frontiers Advanced Production Systems Fund and is being conducted as a component of the *National Tree Crop Intensification in Horticulture Program* (AS18000), a collaborative research program between Almond, Avocado, Citrus, Macadamia and Mango.

Costing tools are coming

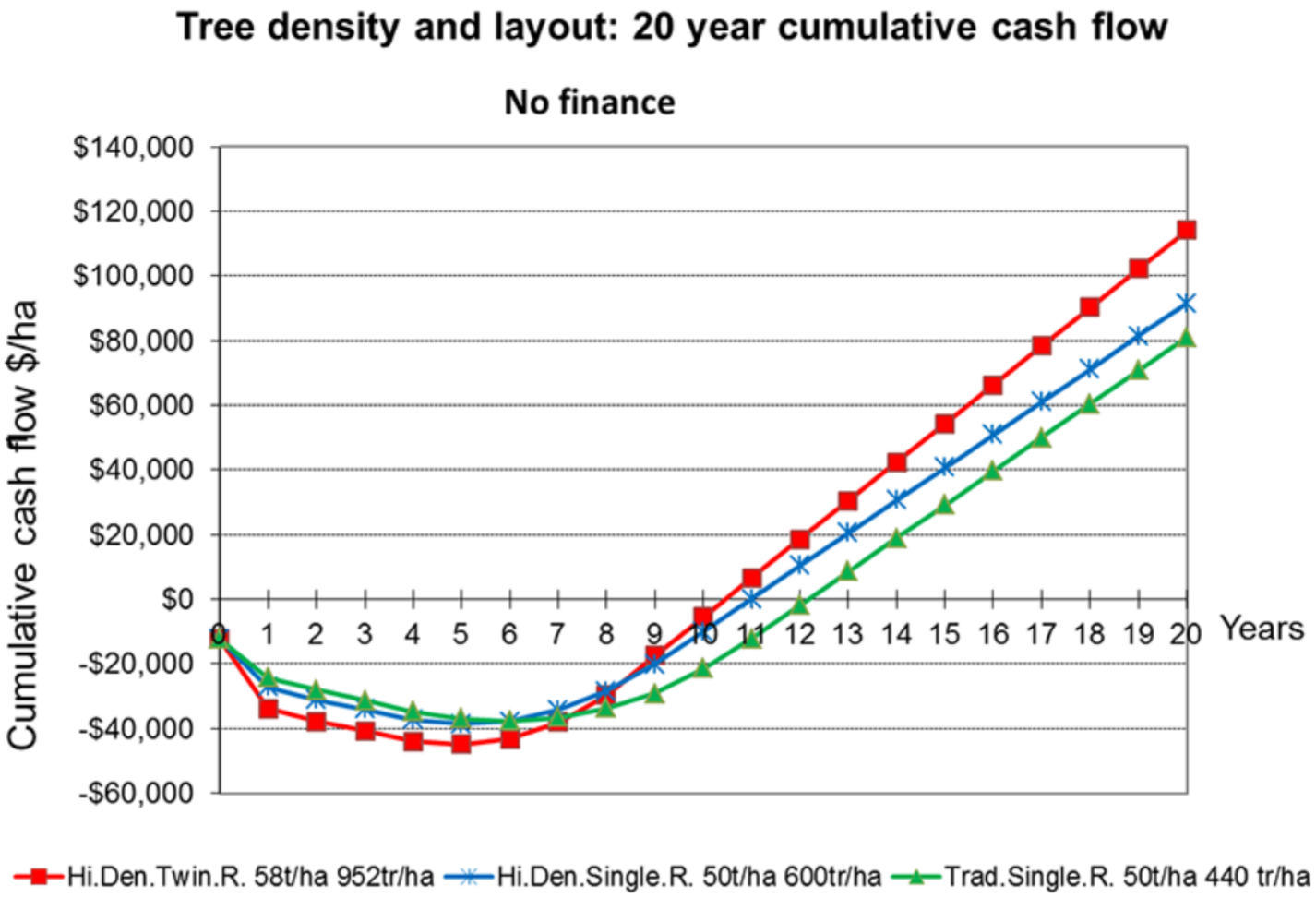
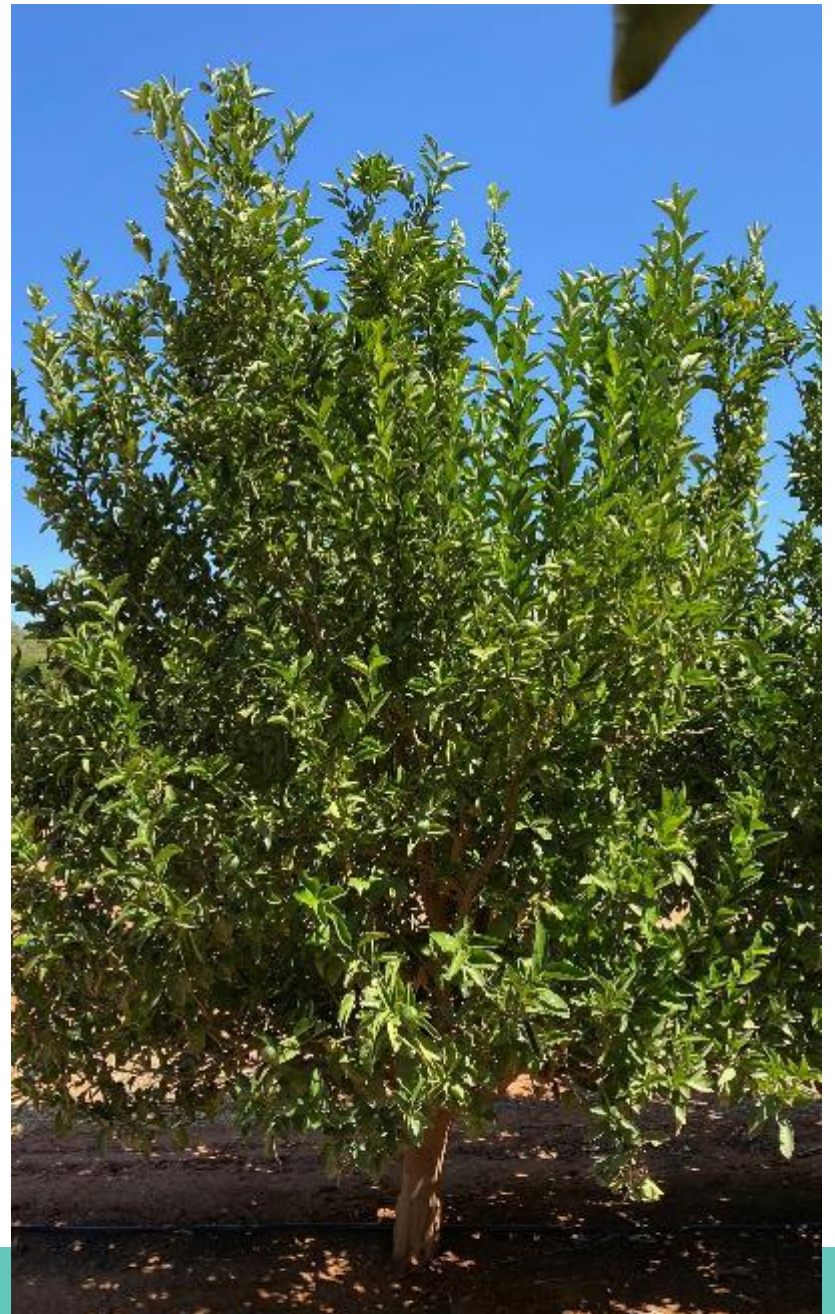


FIGURE 3: The cumulative cash flow of navel oranges at: high-density twin row layout (Hi.Den.Twin.R); high-density single row layout (Hi.Den.Single.R. 600 trees/ha); and traditional density single row layout (Trad.Single.R. 400 trees/ha).



Videos, articles to follow

Journal review

Intensifying citrus tree crops and modifying tree canopies: a brief review

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[1]NSW Department of Primary Industries, Dareton, NSW, Australia
[2]NSW Department of Primary Industries, Menangle, NSW, Australia
[3]NSW Department of Primary Industries, Orange, NSW, Australia

Abstract

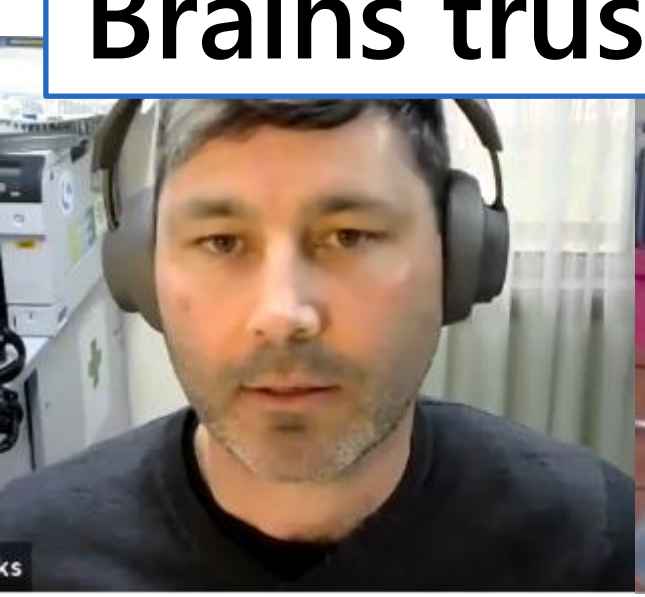
High-density citrus orchards have proven benefits for productivity but canopy management using conventional practices becomes problematic after trees reach their allocated space. This paper reviews the literature on high-density planting of citrus to understand the motivation for crop intensification and the different strategies for manipulating tree size such as dwarfing rootstocks, dwarfing viroids, pruning and trellis training.

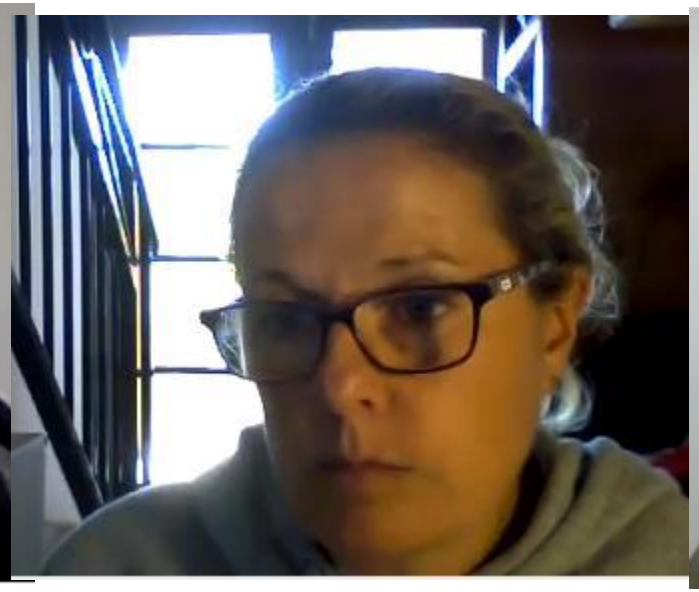
Keywords: citrus, high-density, canopy management, dwarfing, productivity, viroid

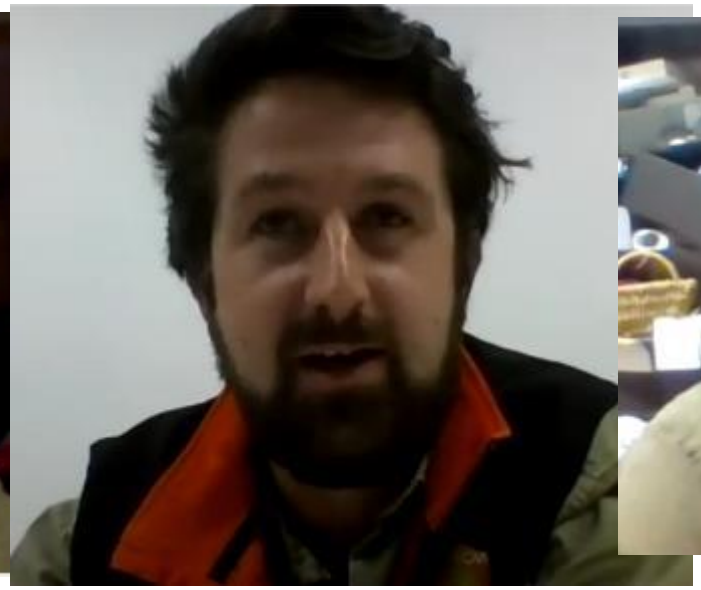
INTRODUCTION

Citrus is an important horticultural crop, contributing significantly to the global economy. Food and Agricultural Organization (FAO) (2020) showed that there were 2,850,000 hectares planted to citrus and 40,600,000 tonnes of fruit harvested from approximately 140 countries, of which Australia contributed 550,000 tonnes (1.35%) from 27,000 productive hectares (0.96%) .

Brains trust








Dareton
Primary Industries
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NATIONAL TREE CROP

Intensification In Horticulture Program

(AS18000)

The *National Tree Crop Intensification in Horticulture Program (AS18000)* is funded by the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Queensland's Department of Agriculture and Fisheries, Plant & Food Research, NSW Department of Primary Industries, Queensland Alliance for Agriculture and Food Innovation- The University of Queensland, Western Australian Department of Primary Industries and Regional Development, South Australian Research and Development Institute, Hort Innovation using the Almond research and development levy, and contributions from the Australian Government.

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