REPORT: I International Symposium on Precision Management of Orchards and Vineyards, Palermo, Italy

Oct 2019

Wiehann Steyn

Hortgro Science

5/1/2019

Content

1. Objectives of the visit 3
2. I. International Symposium on Precision Management in Orchards and Vineyards 4
3. Lessons learned & recommendations 5

Appendices 1 – Contacts list 6
Appendices 2 –Itinerary 7

1. Objectives of the visit:

The objectives of the visit were the following:

- To stay abreast of the newest developments in the field of precision management.
- To maintain and expand networks with researchers working in this field.

2. South Africans attending the symposium:

Wiehann Steyn	Hortgro
Karen Theron	SU Horticultural Science
Chris Jurich	Private consultant – Arbor Tech

3. I. International Symposium on Precision Management of Orchards and Vineyards

Date	7 - 11 October 2019 in Palermo, Italy
Organiser	Profs Riccardo Lo Bianco and Antonino Pisciotta, Dr Roberto Zoppolo and Danilo Cabrera, Department of Agricultural, Food and Forest Sciences - University of Palermo (https://www.unipa.it/Faculty-of-Agriculture-00001/) Dr Luigi Manfrini, Department of Agricultural Sciences - University of Bologna (https://distal.unibo.it/it)
Delegates & RSA participants	• >115 delegates from 24 countries • Karen Theron (SU), Chris Jurisch (Arbor Tech) & Wiehann Steyn
Programme	• Day 1, 7 Oct. Session 1 – Irrigation and Water Relations • Day 2, 8 Oct. Session 2 – Yield and Harvest Monitoring Session 3 – Mapping and Decision Support Platforms • Day 3, 9 Oct. Technical Tour. Feudo Arancio winery with field demonstrations of monitoring devices. Visit olive mill and an intensive olive orchard with field demonstrations of monitoring devices and mechanical implements. • Day 4, 10 Oct. Session 4 – Canopy growth and management Session 5 – Disease and pest pressure detection/control • Day 5, 11 Oct. Session 6 – Fruit growth, ripening, quality and postharvest Session 7 – Soil Management, fertility and nutrition • 52 oral presentations (4 keynote) and 44 posters
Noteworthy and interesting presentations (Astracts and slides attached as annexures to this report)	Session 1: Irrigation and Water Relations • Bianchi et al. Results of an experiment on variable rate irrigation in a vineyard and orchard. • O'Connel. Sensing fruit and tree performance under deficit irrigation in `September Bright´ nectarine • Nadav. Controlling variability in vineyard with variable rate drip irrigation • Brillante et al. Can maps of plant water status assess variability in wine-grape composition and inform selective harvest decisions? • Scalisi et al. Diurnal irrigation timing affects fruit growth in late-ripening nectarines. Session 2: Yield and Harvest Monitoring • Penzel et al. Carbon consumption of developing fruits and derived fruit bearing capacity of individual trees in 'Gala' and 'Pinova' apple orchards. • Robinson et al. Precision crop load management for apples. Session 3: Mapping and Decision Support Platforms/Systems • Taylor. The role of zoning and data fusion in precision horticulture: a review of current and needed capabilities to assist decision-making. Session 4: Canopy Growth and Management • Breen et al. Physiologically-based precision orchard management facilitates increased yields of premium quality fruit. • Fazio & Robinson. Designer rootstocks: the basis for precision management of apple orchards.

	• Lang & Whiting. Canopy architecture - optimizing the interface between fruit physiology, precision crop management, and mechanical/robotic efficiencies. Session 5 – Disease and pest pressure detection/control • Bylemans et al. EVA: an ICT tool to bring precision agriculture to the fruit grower. Session 6 – Fruit growth, ripening, quality and postharvest • Donahue et al. A predictive model for Malus × pumila borkh `Honeycrisp´ to reduce storage risk in Eastern New York State, U.S.A. • Neuwald et al. A proximal precision management approach to monitor apple fruit growth and quality.

4. Take home lessons and recommendations

Lessons learnt / Comments	Recommendations and actions
1. Orchard variability • Many presentations focused on within orchard variability and the negative effects thereof on production, fruit quality and, especially the post storage quality of fruit and defect incidence. Ken Breen of Plant and Food Research in NZ indicated in subsequent informal discussion that quantifying and reducing within orchard variance will be a key focus area for his research group, going forward. • Much effort is being placed on differential management within an orchard to reduce variability and to optimise production. This is a developing field that is receiving much commercial attention. Of particular interest is the use of differential irrigation and rootstocks to reduce variability.	• I believe that between tree and on tree variance, together with low packout %, are the major inefficiencies in SA deciduous fruit production. • Met with Drs A van Niekerk (CGA), E Crouch and E Louw (SU Horticulture) and M Stander (Agrimotion) to discuss potential projects to quantify within orchard variance and the effect thereof on defect incidence. • E Louw has been studying variance in fruit quality in Golden Delicious and the effect of canopy structure, bloom period and rootstock thereon. Awaiting the outcome of this research.
2. Defect prediction • Some presentations focused on the prediction of storage disorders based on pre-harvest variables. This is also a key focus area of Hortgro's postharvest research programme.	• Relevant abstracts were forwarded to local postharvest researchers.

Appendix 1

Contacts:

Prof Todd Einhorn, general horticulturist, Michigan State University, https://www.canr.msu.edu/people/dr_todd_einhorn

Prof Terence Robinson, applied crop physiologist and training system expert, Cornell University, https://hort.cals.cornell.edu/people/terence-robinson/

Prof Luca Corelli Grappadelli, ecophysiologist, University of Bologna, Italy, https://www.unibo.it/sitoweb/luca.corelli/en

Dr Ken Breen, general horticulturist, Plant and Food Research, NZ

Prof Greg Lang, general horticulturist and physiologist, Michigan State University, https://www.canr.msu.edu/people/dr_gregory_lang

Prof Gennaro Fazio, rootstock breeder, USDA and Cornell University, https://www.ars.usda.gov/northeast-area/geneva-ny/plant-genetic-resources-unit-pgru/people/gennaro-fazio/

Dr Mark O'Connell, agricultural water management, Agriculture Victoria, http://www.hin.com.au/networks/profitable-stonefruit-research/10.-dr-mark-oconnell-profitable-stonefruit-research

Dr Alessio Scalisi, ecophysiologist, Agriculture Victoria, http://www.hin.com.au/networks/profitable-stonefruit-research/stonefruit-irrigation-trials/continuous-detection-of-plant-water-status-in-high-density-september-bright-nectarines

Dr Luigi Manfridi, general horticulturist, University of Bologna

Appendix 2

The final tour itinerary was as follows:

Saturday 5 October to Sunday 6 October:
Travel from Cape Town to Palermo via Addis Abbeba and Rome

Monday 7 October to Friday 11 October:
1st International Symposium on Precision Management of Orchards and Vineyards

Saturday 12 October to Sunday 13 October:
Travel from Palermo to Cape Town via Rome and Addis Abbeba